Risk of Weed Expansion

Weed expansion in the analysis area is greatly influenced by habitat susceptibility, seed availability, seed or propagule dispersal, and habitat disturbance. The probability that weeds will expand in the assessment area depends on the interaction of these four factors. Weed expansion begins with the dispersal of seed from existing weed infestations adjacent to uninfested areas. Roads and trails are the primary means by which people and domestic animals interact with the environment and therefore are an important spread vector. These linear corridors act as dispersal networks for exotic plants. In addition, road and trail management creates sustained levels of soil disturbance that promotes exotic plant densities there by increasing seed for ongoing dispersal into adjacent areas. The majority of documented infestations within the assessment area is along the transportation corridors.

Disturbance creates spatial and temporal openings where sites become suitable for plant establishment, and where usable light, space, water and nutrients are available to meet the specific growing requirements of the plant. Disturbance may increase the susceptibility of an otherwise intact plant community to weed invasion by increasing the availability of a limited resource. Natural or human caused fires along with timber harvest and grazing are board scale disturbances that influence the amount of available habitat for weed establishment.

Weed expansion risk in the assessment area was determined by assessing the susceptibility of habitat type groups, the presences of weed infestations (seed source), the amount of recently burned or harvested areas (site disturbance), and the density of roads or trails (spread vector). Table 4.36 summarizes the rating matrix that determined the probability of expansion for invasive weeds.

Table 4.36: Probability of Weed Expansion

Habit. Suscept.	Seed Source	Site Disturbance	Spread Vector	Expansion Probability
Rating	**Weeds Present or Adjacent**	**Fire/harvest/ Grazing**	**Adjacent Road/trail**	**Rating**
High	Yes	Yes	Yes	Extreme
			No	High
		No	Yes	
			No	
	No	Yes	Yes	
			No	Moderate
		No	Yes	
			No	
Moderate	Yes	Yes	Yes	High
			No	Moderate
		No	Yes	
			No	
	No	Yes	Yes	High
			No	Moderate
		No	Yes	
			No	Low
Low	Yes	Yes	Yes	High

Habit. Suscept.	Seed Source	Site Disturbance	Spread Vector	Expansion Probability
			No	Moderate
		No	Yes	
			No	
	No	Yes	Yes	
			No	Low
		No	Yes	
			No	

Table 4.36, above, summarizes the probability rating that invasive weeds would expand within the analysis area. Map 47 displays the spatial arrangement of areas with the greatest risk of weed expansion. These zones contain moderately to highly susceptible habitats, frequent disturbances, roads and trails. The interaction of these three factors creates conditions very conducive to weed establishment and dispersal. Areas were rated as extreme if weed infestations were found within or adjacent to high probability zones. Extreme risk of spread suggests that all factors that contribute to weed expansion (habitats, seed source, disturbance, and spread vector) are present over a relatively small area. Upper Selway Canyon, Selway Headwaters, White Cap, and Deep Creek ERUs are probably at highest risk, because of susceptible habitat, roads, and recent fires. Clear Creek and Middle Fork Clearwater River ERUs are not appropriately assessed because information on disturbance is lacking for other land ownerships.

In the past, weed management has been uncoordinated, sporadic, and largely ineffective in controlling weed invasions in the assessment area. Since noxious weeds and other invasive exotic plants can affect ecological integrity, habitat conditions, and the achievement of restoration objectives, exotic plants must be integrated into management strategies and prescriptions developed for the subbasins.

TERRESTRIAL WILDLIFE

INTRODUCTION

Terrestrial environments within the Selway and Middle Fork Clearwater subbasins are diverse and provide habitat for an estimated 190 avian species, 61 mammalian species, 8 reptilian species, and 6 amphibian species. The subbasin landscape is mountainous and highly dissected with deeply incised canyon stream courses. It varies from the dry, low-elevation Selway River canyon characterized by ponderosa pine, shrubland, and bunchgrass communities, to subalpine fir and whitebark pine habitats in cold, alpine elevations that range to 9,000 feet and above and are interspersed with lake basins.

Fire is a prominent influence in defining the Selway and Middle Fork assessment area landscape and the native species that evolved with it. Fire maintains mosaics of vegetative diversity that provide early seral communities and sustain old growth by periodically reducing fuel accumulations. Climatic variations within the subbasins also contribute to the area's biological diversity. A warm and moist maritime climatic influence belt along the Selway River canyon is responsible for an array of coastal disjunct species, including western red cedar and Coeur d'Alene salamander.

The vast expanse of remote, relatively undisturbed lands in and adjacent to the subbasins is a notable influence on the quality of wildlife habitat. Seventy-eight percent, or nearly a million acres of the 1.4 million-acre Selway and Middle Fork Clearwater Rivers subbasins is within the Selway-Bitterroot Wilderness Area. The Selway-Bitterroot Wilderness is a 1.3 million-acre contiguous tract of wilderness administered by three national forests. The subbasin assessment area also

includes 261,000 acres of roadless lands. Only 14,500 acres, or one percent, of the assessment area is not classified as wilderness or roadless. The wilderness and roadless characteristics provide habitat for many species dependent on remote environments with relatively little human disturbance including grizzly bears, wolverines, lynx, wolves, bighorn sheep, mountain goats, and harlequin ducks.

Traditionally, the focus on wilderness and wild country management has been to provide for important human uses like recreation, trail access, and outfitting with less emphasis on wildlife and other ecological considerations that define wilderness environments. Environmental impacts are magnified in wilderness because the Wilderness Act mandates significantly higher standards for degradation. Wilderness also provides unique habitat for security sensitive species that are absent or rare outside wilderness. These populations need adequate evaluation of existing and potential threats to their viability and their contribution to wilderness environments.

HISTORIC AND CURRENT HUMAN INFLUENCES AND VALUES ASSOCIATED WITH SUBBASIN POPULATIONS AND HABITATS

Historic Influences and Values

Prior to Euro-American settlement, the Nez Perce people occupied a territory that included the Selway and Middle Fork Clearwater subbasins assessment area. The aboriginal territory is estimated at 13,204,000 acres; it encompassed the entire Clearwater River basin in Idaho, the Wallowa country in northeast Oregon, and the upper portion of the Salmon River basin. Historically, the Nez Perce was one of the largest Plateau tribes in the Northwest (Walker, Jr., 1978 in Johnson, 1980).

The Nez Perce people depended on wildlife for food, clothing, shelter, and other implements used in daily life. They acquired horses in the 1750s and subsequently made annual trips to Montana to hunt buffalo and antelope. Buffalo hides gradually replaced mats to cover houses and were also used for clothing, blankets, saddles, rope, and tepees. The Nez Perce hunted numerous other species that inhabited their territory including deer, elk, moose, bighorn sheep, grouse, waterfowl, black bear, and grizzly bear. Many other birds and small mammals were also snared or shot. The Nez Perce intentionally ignited fire to create more abundant forage for their livestock and the wild ungulates the people depended upon.

Deer and elk hides were used for clothing and robes were made from bison skin. Women decorated their dresses with elk teeth and wrapped their braids with fur. Porcupine quills and beads of bone and shell were also used for ornamentation. Splitting wedges were made from antlers and some spoons and drinking cups were made from horn. Bows were made of syringa and yew and backed with sinew. Bows were also made from the horns of bighorn sheep that were boiled and straightened. These were valued for superior strength and superior penetration of arrows shot from them. The bows of bighorn sheep became rare by the turn of the century as bighorn populations declined.

Hunting was a sacred part of Nez Perce life. The Nez Perce believed in a supernatural side to their existence and to all nature. They believed that all natural things including rocks, trees, birds, animals, rivers, fish, and heavenly bodies could influence them in important ways. Most ceremonies included many expressions of respect for animals. It was believed that before human beings came, animals dominated the earth and behaved like human beings. When humans arrived, the animals maintained the ability to withhold their flesh from people if they were offended. Each animal species was represented in the guardian spirits who gave people power and abilities for success in life.

The Nez Perce people were closely attuned to the signs of nature. They watched for any unusual behavior by animals, insects, birds, and even the moon or sunsets, which helped them to predict weather conditions. Wild animals remain an integral part of Nez Perce culture today, providing food, clothing, and shelter, as well as spiritual significance (Slickpoo and Walker, Jr., 1973).

Euro-Americans arrived in Nez Perce country in the early 1800s. The fur trade flourished from 1811 to 1840. Missionaries arrived with aspirations to convert the Nez Perce from a hunter-gatherer culture to an agrarian one. Although the concept of land ownership was previously foreign to the Nez Perce, they were allocated a portion of their original territory when they signed their first treaty with the United States government in 1855. They defined the boundaries of their territory and a 7.7 million acre reservation was established. Consequences of the 1860s gold rush and subsequent treaties and wars with the United States government resulted in a significantly diminished reservation by the late 1800s, which is now restricted to only a portion of the Middle Fork Clearwater River basin.

The Nez Perce were one of the few tribes that negotiated to retain off-reservation hunting and fishing rights in their treaties with the United States. Off-reservation hunting and fishing rights are considered to be exercisable only on the lands that were part of the tribe's usual and accustomed hunting and fishing area. A tribal member with these rights may hunt anywhere on the open and unclaimed lands that were ceded by his specific tribe to the government. Several court cases have determined that tribes have the authority to regulate hunting and fishing by their tribal members within their ceded lands and usual and accustomed sites (Cohen, 1982 in Johnson, 1980).

Current Influences and Values

Court decisions in the 1970s affirmed tribal management authority for off and on-reservation hunting and fishing, resulting in tribes becoming active in developing their own fish and wildlife programs. The Nez Perce Tribe wildlife program was established in 1987 and is responsible for developing wildlife management plans, assessing mitigation needs, and conducting monitoring for deer and elk populations within the ceded lands (Johnson, 1990). In 1996, the Nez Perce tribe also assumed management and monitoring of the central Idaho wolf recovery program. In more recent years, the Tribe has undertaken active management of tribal property to benefit wildlife, both on the reservation and off the reservation within ceded lands. These efforts are primarily associated with mitigating losses of inundated habitat, including low elevation winter range and riparian areas, as a result of hydropower development. Mitigation includes acquisition of additional property within the ceded lands (Sondenna, 2001)

Subsequent to Lewis and Clark's 1806 encounter with the Nez Perce people, American and Canadian trappers established trading posts in the area. Settlement accelerated with the discovery of gold on the Nez Perce reservation near Orofino, Idaho. Trappers supplied a growing fur market and settlers depended on wildlife for food and other survival needs. As settlement progressed, some of the species indigenous to the area were extirpated, including the gray wolf and grizzly bear.

Settlement of the west and conversion of natural landscapes continued to accelerate in the 1900s. Concern for negative influences on the environment and biological diversity led to subsequent passage of laws designed to reduce environmental impacts. The most influential laws addressing wildlife and wildlife habitats in relation to human activities are the National Environmental Policy Act of 1969, the Endangered Species Conservation Act of 1973, the Federal Land Policy and Management Act of 1976, and the National Forest Management Act of 1976. These laws require that animal populations and habitats be assessed before the effects of an environmental disturbance can be addressed (Hunter, 1990).

Two federal agencies, the U. S. Fish and Wildlife Service and the U. S. Forest Service (Northern Region) have designated many species within the subbasins for special consideration. The Endangered Species Act, administered by U. S. Fish and Wildlife Service, mandates protection of threatened and endangered plant and animal species. Such species typically are very habitat-specific with narrow geographic and environmental distributions. These species use specific and often scarce or declining habitats. They are also typically rare, and some with large bodies and large home ranges use a variety of environments and resources across landscapes for meeting individual, breeding, and population needs for persistence.

Additional federal legislation, such as the Migratory Bird Conservation Act and regulations concerning air and water quality, has implications for providing habitats at landscape and geographic scales.

Table 4.37 lists federally designated assessment area species with associated designations. The "endangered" designation signifies any species in danger of extinction throughout all or a significant portion of its range [ESA 3(8)]. "Threatened" species are any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

A “proposed” species is any species of fish, wildlife, or plant that is proposed in the *Federal Register* to be listed under section 4 of the Endangered Species Act [50 CFR 402.02]. No assessment area wildlife species are proposed for listing at this writing.

“Candidate” species are those species that, in the opinion of the USFWS, may become endangered or threatened. There are three categories of "candidate" species --- C1, C2, and C3. No subbasin wildlife species are designated in the C1 and C3 categories, but there are several C2 designations. The C2 category includes taxa for which information now in possession of the USFWS indicates that proposing to list the species as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threats are not currently available to support proposed rules.

The Northern Regional Forester of the U. S. Forest Service has designated as "sensitive" those species for which population viability is a concern. Management indicator species are designated by national forests to serve as “bellwethers” that are sensitive to and reflect a range of changes in environmental and ecological conditions and processes on each forest.

In addition, the state of Idaho (Idaho Department of Fish and Game) maintains a list of “species of special concern.” These include native species that are either low in numbers, limited in distribution, or have suffered significant habitat losses. Species of special concern within the subbasins are also listed on Table 4.37.

Table 4.37: Selway and Middle Fork Clearwater Rivers Subbasin Wildlife Species with Federal and State of Idaho Designations

Amphibians				
Scientific Name	Common Name	USFWS Status	USFS Region 1 Status	State of Idaho Status
Plethodon vandykei idahoenis	Coeur d'Alene Salamander	C2	S	SC
Dicamptodon atterimus	Idaho Giant Salamander	C2		
Ascaphus truei	Tailed Frog	C2		
Rana pretiosa	Spotted Frog	C2		SC
Bufo boreas boreas	Boreal Toad		S	SC
Rana pipiens	Northern Leopard Frog		S	SC
Reptiles				
Diadophis punctatus	Ring-necked Snake	C2		SC
Thamnophis sirtalis	Common Garter Snake	C2		
Birds				
Haliaeetus leucocephalus	Bald Eagle	T	MIS	

Falco peregrinus anatum	Peregrine Falcon		S/MIS	
Histrionicus histrionicus	Harlequin Duck	C2	S	SC
Gavia immer	Common Loon		S	SC
Aegolius funereus	Boreal Owl	C2		SC
Oreotyx pictus	Mountain Quail	C2	S	SC
Otus flammeolus	Flammulated Owl	C2	S	SC
Glaucidium gnoma	Northern Pygmy Owl	C2		SC
Picoides arcticusi	Black-backed Woodpecker	C2	S	SC
Picoides albolarvatus	White-headed Woodpecker	C2	S	SC
Accipiter gentilis	Northern Goshawk	C2	S/MIS	SC
Dryocopus pileatus	Pileated Woodpecker		MIS	SC
Strix nebulosa	Great Gray Owl	C2		SC
Sitta pygmaea	Pygmy Nuthatch	C2		SC

Mammals				
Canis lupus	Gray Wolf	E/XN	MIS	
Ursus arctos horribilis	Grizzly Bear	T	MIS	
Felis lynx	Lynx	T		SC
Gulo gulo	Wolverine	C2	S	SC
Plecotus townsendi	Townsend's Big Eared Bat	C2	S	SC
Myotis ciliolabrum	Western Small-footed Myotis	C2		
Myotis evotis	Long-eared Myotis	C2		
Myotis thysanodes	Fringed Myotis	C2		SC
Myotis yumanensis	Yuma Myotis	C2		
Martes pennanti	Fisher	C2	S/MIS	SC
Martes americana	Pine Marten		MIS	
Alces alces shirasi	Shira's Moose		MIS	
Ovis canadensis	Bighorn Sheep		MIS	
Cervus elaphus	Rocky Mountain Elk		MIS	

U. S. Fish and Wildlife Service (USFWS) Designations, July 2000

E = Endangered; **T** = Threatened; **XN** = Experimental or non-essential population; and **C** = Candidate.

U. S. Forest Service Northern Region and National Forest Designations (USFS), July 2000

S = Sensitive in the Northern Region; **MIS** = Management indicator species on the Nez Perce National Forest

State of Idaho Designations, February 2001

SC = Species of Special Concern

In accordance with the Endangered Species Act, gray wolf reintroduction was initiated in central Idaho in 1995. Wolves are now successfully reproducing in and adjacent to the subbasins. Grizzly

bear recovery planning is ongoing. The U. S. Fish and Wildlife Service prepared the *Final Environmental Impact Statement For Grizzly Recovery In The Bitterroot Ecosystem* in March 2000 and a subsequent decision to reintroduce grizzlies was signed. The wilderness portion of the Selway subbasin comprises most of the proposed core recovery area for the grizzly bear, in addition to the adjacent Frank Church-River of No Return Wilderness Area.

Important human influences affecting wildlife habitat and species vulnerability in the subbasins are the following: disturbances associated with transportation systems, including roads, trails, and airfields; administrative sites and residential developments; logging; grazing; fire suppression; weed encroachment; recreation; and hunting, trapping, and baiting activities.

The lower portion of the subbasins not designated wilderness or roadless, has been impacted by road building and logging, primarily on the flatter uplands. Residential, recreational, and administrative developments are primarily confined to the lower Selway canyon, although Moose Creek Ranger Station and Airfield is a significant developed administrative site in the Selway-Bitterroot Wilderness interior and a few private inholdings are also within the wilderness boundaries. The wilderness portion of the subbasins has an extensive trail system associated with numerous outfitter camps, non-outfitter camps, and Forest Service administrative sites. Weed encroachment, especially spotted knapweed and sulfur cinquefoil, has influenced the native plant composition, and thus wildlife habitat, in the Selway River canyon. Fire exclusion has impacted the abundance of important dead wood and early seral habitats, maintenance of ponderosa pine and other old growth, winter range integrity, and high elevation whitebark pine communities used by grizzly bears.

The trend in public demand for special, wild forest products like mushrooms, huckleberries, and beargrass is increasing with associated impacts to wildlife habitat. Mushrooms and huckleberries are important food sources for subbasin wildlife. Bear grass is utilized by some species for forage and for nesting cover. Other consequences of harvesting these products to ecosystem integrity and function are largely unknown. The extent of special harvest in the subbasins is unknown, but dramatic declines in revenue to rural forest communities from harvest of federal timber are increasing the importance of the special forest products industry in rural economic recovery and development (Kohm and Franklin, 1997).

HISTORIC AND CURRENT STATUS OF SUBBASIN HABITATS AND POPULATIONS

Habitats and Associated Species Guilds

This assessment primarily addresses species by guilds according to three broad habitat associations. Other unique habitats and species groups that need special consideration are addressed as well.

Habitats in each of the assessment area ERUs were analyzed on a coarse scale and divided into three primary categories based on habitat type group (Appendix A) aggregations. These three categories are referred to as *xeric*, *mesic*, and *alpine* (Map 49).

Each of the three habitat aggregations is further divided into four structural or successional classes with corresponding size class ranges (Map 50 and Tables 4.38, 4.43, and 4.44). Canopy density for each structural class was described using four divisions: high with greater than 70 percent canopy cover; moderate with 40 to 69 percent canopy cover; low-moderate with 15 to 39 percent canopy cover; and low with 0 to 15 percent canopy cover (Maps 51, 52, and 53). These habitat parameters are also displayed in tables by ERU in Appendix F.

Representative species assemblages are identified for each of the three habitat aggregations. Relationship to habitats, departures from historic conditions, and key threats are discussed for each species. Conservation recommendations for each species are addressed in Appendix Q.

XERIC HABITATS AND ASSOCIATED SPECIES

Xeric habitats are uncommon in the subbasins and represent only 15 percent of the habitats. They are concentrated in the upper Selway, lower Middle Fork Clearwater, lower Clear Creek,

and on the north and east faces of tributaries. Key habitat features of the xeric aggregation include ponderosa pine old growth and winter range bunchgrass communities (Map 51).

Xeric habitats include habitat type groups (HTGs) 1 and 2 and grasslands. Habitat type groups 1 and 2 are characterized by warm and dry ponderosa pine and Douglas-fir, and moderately warm and dry Douglas-fir and grand fir. Trees in these habitats are typically open grown with bunchgrass and shrub understories. The xeric habitats primarily occur at low elevations on south and west aspects. Some slopes in the drier habitats are steep. The following table describes the elements of the xeric habitat aggregation.

Table 4.38: Xeric Habitat Aggregations

Xeric Habitats				
Structure	Early seral	Mid-seral	Late seral	Old growth
Potential Vegetation	HTG 1and 2 and grasslands	HTG 1and 2	HTG 1and 2	HTG 1and 2
Size Class	Herbaceous, shrub, seedling, sapling, small pole	9 to 21 in. dbh	≥ 21 in. dbh and not old tree	Old tree

dbh=diameter at breast height

Departures from Historic Conditions

Ponderosa pine communities in xeric habitats have significantly declined in the subbasins compared to historic representation. The large, old trees, important to species like the white-headed woodpecker have declined the most due to timber harvest in the roaded areas and fire suppression throughout the subbasins. Risk for stand replacing fires has also increased due to encroachment of shade tolerant understories and reduction in open stands in the absence of fire. Dead and dying wood habitat that provides important foraging, nesting, and denning sites is also diminished from historic occurrence due to fire suppression, timber harvest, and firewood gathering in localized areas.

Winter range integrity has diminished in the subbasins as a result of fire suppression, weed encroachment, motorized use, and agricultural and residential development. These changes have important habitat implications for ungulates, including bighorn sheep, elk, and mule deer, and carnivores that prey on them. Impacts to open xeric habitats, including weed encroachment and reduction of shrub galleries have also reduced mountain quail habitat.

Representative Species Associated with Xeric Habitats

- Carnivores: Mountain lion
- Birds: White-headed woodpecker, flammulated owl, mountain quail
- Reptiles: Western rattlesnake
- Ungulates: Rocky Mountain bighorn sheep, Rocky Mountain elk, mule deer

MOUNTAIN LION (*Felis concolor*)

Status

Status Designation: Federal, not listed; State of Idaho, game species.

The mountain lion was selected as the carnivore representative for this guild because it depends on winter range prey in xeric habitats in the most prey-limited season and because it has large

space requirements that encompass habitats for many other species in the subbasins. Mesic and alpine communities also provide important habitat for mountain lions.

Mountain lions are commonly hunted in central Idaho, where populations have been relatively high since the 1980s. Once a rare occurrence, mountain lions have frequently been observed in daylight hours in the subbasins in the last 10 years. According to harvest data collected by Idaho Department of Fish and Game biologists, populations began to decline in the Clearwater basin in 1997 along with black bears (Nadeau, 2000). The decline may be related to the sharp decrease in elk populations.

Ecology

In Idaho, mountain lions prefer montane and semi-wooded canyon habitat, but in winter they rely heavily on winter range in xeric habitats. Mountain lions require large tracts of land and available prey for their habitat needs. In winter, they rely heavily on winter range prey in xeric habitats. Mountain lions are opportunistic and prey on large and small mammals including bighorn sheep, coyotes, and livestock. Hornocker (1970) reported mule deer and elk were the primary food in Idaho from September through May, and Columbian ground squirrels were the most common food source in summer.

Departures from Historic Conditions and Current Threats

Historically, mountain lions were hunted for bounty in the subbasins and populations were significantly reduced by 1935. In 1946, only 20 mountain lions were estimated to occur in Moose Creek (Smolinski and Biddison, 1988). Today, hunting mountain lions is regulated and populations remain viable. However, resources are limited for enforcement of regulations in the field to deter poaching in the subbasins and associated mortality is unaccounted for. When populations decline, this factor becomes more important.

Most lion hunters outside the wilderness use motorized vehicles to locate tracks and to transport hunting hounds. The type, density, and distribution of roads within a lion's home range can greatly influence hunter success (Murphy 1983; Barnhurst, 1986). The assessment area, most of which is designated wilderness, provides abundant habitat over a large geographical area for mountain lions. No significant impediments to security or dispersal and genetic interchange within the subbasins and between adjacent areas are currently evident. Impacts to winter range, including motor vehicle access and weed encroachment, have decreased winter range habitat quality for mountain lion prey.

WHITE-HEADED WOODPECKER (*Picoides albolarvatus*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species (USFS); State of Idaho, protected species of special concern.

As well as being designated a sensitive species in the U. S. Forest Service Northern and Intermountain Regions, the white-headed woodpecker is also listed as a protected species of special concern in Idaho and as a sensitive-critical species in Oregon. Additionally, the white-headed woodpecker is considered at risk under land management alternatives proposed for interior Columbia River basin (Lehmkuhl et al., in press).

The white-headed woodpecker is a year-round resident of the Nez Perce National Forest and the adjacent Payette National Forest. The Nez Perce is the only national forest in the Forest Service Northern Region with suitable habitat for white-headed woodpeckers. Although there are no documented sightings in the Selway and Middle Fork Clearwater subbasins, white-headed woodpeckers were observed at Jersey Mountain Ridge in the adjacent Salmon River basin in 1990. Current white-headed woodpecker population status in the subbasins is unknown.

Ecology

The white-headed woodpecker is associated with open-canopy, old ponderosa pine and mixed ponderosa pine and Douglas-fir forests, usually from 3,900 to 8,900 feet elevation. The white-headed woodpeckers nest in hollows of large-diameter snags or leaning logs (Milne and Hejl, 1989). White-headed woodpeckers avoid recently cut and early seral clearcuts but have been known to occupy uncut coniferous forest and shrublands if snags and dying trees are retained (Hagar, 1960). The most significant suitable habitat for white-headed woodpeckers occurs in the White Cap Creek ERU in the largest patch of old ponderosa pine forest within the subbasins.

Departures from Historic Conditions and Current Threats

Old ponderosa pine with high commercial value has been reduced by timber harvest in Middle Fork Clearwater and Clear Creek ERUs and this reduction of old ponderosa pines has contributed to white-headed woodpecker habitat loss in the subbasins.

Fire exclusion in old pine forests throughout the subbasins has accelerated fuel accumulation with increased risk for stand replacing fire events and has facilitated encroachment of shade tolerant tree species that reduces ponderosa pine habitat. Removal of standing snags in old ponderosa pine stands for firewood may have reduced white-headed woodpecker nesting, roosting, and foraging sites. White-headed woodpeckers are also sensitive to nest tree disturbance that can increase mortality rates and result in use of less preferred habitats (Blair and Servheen, 1993). Historic white-headed woodpecker population status in the subbasins is unknown.

FLAMMULATED OWL (*Otus flammeolus*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service), sensitive species (USFS); State of Idaho, species of special concern.

The flammulated owl is designated as a sensitive species in the Northern, Rocky Mountain, Southwestern, and Intermountain Regions of the U. S. Forest Service. It is classified as a species of concern in Idaho, Montana, and Oregon, and a candidate species in Washington. The North American populations of flammulated owls are considered neotropical migrants and breed from British Columbia through the western U. S. and south to central Mexico. The flammulated owl winters from central Mexico, south in the highlands to Guatemala and El Salvador, and casually north to southern California.

Although limited survey work has been done in the subbasins, the owl has been documented in the lower and upper Selway River canyon. Formal surveys for flammulated owls were conducted adjacent to the subbasins in the Salmon River canyon and the South Fork Clearwater River canyon in 1992. Singing male flammulated owls were recorded in the Salmon River canyon. No flammulated owl observations were recorded in the South Fork Clearwater River canyon (Shepherd and Servheen, 1992).

Ecology

In Idaho, the flammulated owl prefers old growth and occupies older ponderosa pine and Douglas-fir, and mixed coniferous forests. Stands used by flammulated owls also tend to be relatively open (Goggans, 1986). The presence of cavities and snags is important in habitat selection (Reynolds and Linkhart, 1992). Flammulated owls have a low reproductive rate and one of the lowest and least variable clutch sizes of North American owls. They must be extremely specialized for high longevity and low reproductive output.

Departures from Historic Condition and Current Threats

Habitat loss, including loss of old ponderosa pine and Douglas-fir forests and associated nest cavities, is the greatest threat to flammulated owls in the subbasins. Timber harvest in Middle Fork Clearwater and Clear Creek ERUs has reduced flammulated owl habitat. Changes in forest

structure may also have impacted insect communities that owls depend on for forage. The decline in snag recruitment in the subbasins through fire suppression and timber harvest has impacted habitat for flammulated owls. Removal of dead trees for firewood in ponderosa pine and Douglas-fir forests can potentially impact flammulated owl nesting and foraging habitat.

Fire exclusion in old pine throughout the subbasins has accelerated fuel accumulation with increased risk for stand replacing fire events and artificially high insect and plant pathogen populations, and has facilitated encroachment of shade tolerant tree species.

Metapopulation structure has not yet been documented but may be important where the ponderosa pine and Douglas-fir forest type has been fragmented.

MOUNTAIN QUAIL *(Oreortyx pictus)*

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service), sensitive species (USFS); State of Idaho, species of special concern.

The mountain quail is native only to the western mountains of the United States and the Baja peninsula of Mexico. It is a resident from southwestern British Columbia, western and southern Washington, and central Idaho, south through the mountains of California and northern and western Nevada, to northern Baja California and Mexico.

The mountain quail is limited in the Forest Service Northern Region to north central Idaho and is considered a sensitive species in the Northern Region. It is listed as a species of special concern in the State of Idaho. In Idaho, mountain quail hunting season has been closed statewide since 1984 to protect the remnant population (Vogel and Reese, 1995).

The remaining mountain quail population nucleus in Idaho occurs in the Little Salmon River, the Salmon River, and the Snake River canyons of west-central and north-central Idaho (Heekin, 1994). Mountain quail historically occurred in the subbasins. Observations were documented in the last 10 years in the Clear Creek ERU near Kooskia and one observation at the Fenn Ranger Station was recorded in 1974. An account of a mountain quail at the site once occupied by Three Links Ranger Station in the Gedney and Three Links ERU was documented in the 1950s. Current population status in the subbasins is unknown.

Potential mountain quail habitat in the subbasins occurs in the lower Middle Fork Clearwater canyon, lower Clear Creek, the Selway River canyon, and xeric tributaries including White Cap, Indian, Deep, and Three Links Creeks.

Ecology

Mountain quail are year-round residents with only nominal vertical migration (Ormiston, 1966). They live in ponderosa pine and Douglas-fir forest types with shrub communities, forest and meadow edges, and dense undergrowth. In Idaho, mountain quail habitat was dominated by tall shrubs that averaged 10 feet in height with an average canopy density of 45 percent that were within a few hundred meters of water. They occur most frequently in draws with shrub galleries along the breaks and secondary drainages of the Snake, Salmon, and Clearwater Rivers.

Mountain quail are adapted to habitats in disturbance dependent environments. Wildfire is probably significant in range expansions and contractions and in local population dynamics. In the long term, habitat suitability is increased after fire when senescent vegetation is removed, new plant growth is generated, and native shrub communities recolonize.

Departures from Historic Condition and Current Threats

Populations have declined in Nevada, Idaho, eastern Oregon, and eastern Washington. Reasons for declines remain unknown and mountain quail breeding biology is poorly understood (Delehanty et al., 1995). The Idaho population has been declining since 1990, possibly due to riparian habitat degradation, fire suppression, disease, and other factors. Predation by feral cats

may also be a factor. The decline of mountain quail in Idaho after hunting stopped suggests that other factors also contributed to the decline (Brennan, 1991).

Mountain quail populations have been extirpated from regions within historic range following systematic fire suppression (L. Brennan, personal communication). Heekin (personal communication, 2000) believes that mountain quail declines in Idaho can be attributed to habitat loss. Reduction in deciduous shrub cover on wintering range, especially Douglas hawthorne, is often due to road building or residential development and landscaping that replaces native shrubs with exotics. Loss of ponderosa pine breeding and brood rearing habitat through advancement of succession in the absence of fire has also diminished mountain quail habitat in the subbasins. Weed encroachment has probably influenced availability of native forage species.

Logging in nesting habitat during the nesting period has resulted in mountain quail nest loss (Miller, 1950), but logging may also benefit mountain quail by conversion of forest to shrub cover, and other early seral vegetation.

Past heavy grazing by cattle and sheep in mountain quail habitat may have reduced availability of important annual foods and perennial shrubs (Belding 1878; Miller 1950; Brennan 1991). But moderate grazing on the Little Salmon River in Idaho appeared to improve mountain quail mobility by opening the dense grass and forb ground cover (Heekin, personal communication, 2000).

WESTERN RATTLESNAKE *(Crotalus viridus)*

Status

Status Designation: Federal, not listed; State of Idaho, not listed.

The western rattlesnake is an unprotected nongame species in Idaho. It is the only dangerously venomous snake species in Idaho. The Northern Pacific subspecies (*Crotalus viridis oreganus*) is found in west-central Idaho in the Selway and Middle Fork Clearwater Rivers subbasins and in the drainages of the Salmon, Clearwater, and Snake Rivers. Potential rattlesnake habitat in the subbasins occurs in the lower Middle Fork Clearwater canyon, lower Clear Creek, the Selway River canyon and its xeric tributaries including White Cap, Indian, Deep, and Three Links Creeks. The status of rattlesnake populations and the significance of rattlesnake harvest in the subbasins are unknown.

Ecology

Western rattlesnakes are usually found in xeric habitats with sparse vegetation (Storm and Leonard, 1995). The area typically has a rocky component or has one in adequate proximity to be utilized as a hibernaculum during the winter. Hibernacula are generally on south facing slopes and are not shaded by vegetation (Nussbaum et al., 1983).

Primarily terrestrial, western rattlesnakes are usually active during the day in cool weather but active at night in hot weather. Western rattlesnakes live in mammal burrows, crevices, or caves when inactive. They are active from late March to October in southern British Columbia and northern Idaho. Individuals usually return to the same den each year. They hibernate for about 210 days and can suffer up to 34 percent mortality during that time.

Departures from Historic Conditions and Current Threats

Historic rattlesnake population status in the subbasins is unknown. Threats to rattlesnakes in the subbasins include disturbance or destruction of hibernacula and other habitat reduction. Trail and road maintenance and construction, extraction of rock and other fill material, and logging in rattlesnake habitat may directly impact rattlesnakes, especially during hibernation from October to March and during aestivation in extreme hot weather. Agricultural, domestic, and commercial development is also a potential threat to rattlesnake habitat, which is synonymous with environments attractive to human habitation.

The western rattlesnake is adapted to habitats in disturbance dependent environments. Fire exclusion in the subbasins may have impacted rattlesnake prey base by reducing habitat for small mammals.

Rattlesnakes are collected for both personal and commercial purposes and collection is unregulated in Idaho. Collectors have markets for live snakes, rattlesnake meat, and parts of rattlesnakes including skins, heads, and rattles. Rattlesnakes are often feared by humans and are commonly killed when encountered in the subbasins. Fueling and torching rattlesnake dens has been common in the Kooskia area according to local residents.

ROCKY MOUNTAIN BIGHORN SHEEP *(Ovis canadensis canadensis)*

Status

Status Designation: Federal, management indicator species (USFS, Nez Perce National Forest; State of Idaho, not listed.

The Rocky Mountain bighorn is designated a management indicator species on the Nez Perce National Forest. It is also considered a wilderness sensitive species in much of the literature (Garton and Hayward, 1989). Wilderness sensitive species generally have more restrictive habitat needs and rely on wilderness or other remote environments with limited disturbance.

Bighorn sheep winter in the upper and middle Selway River canyon in the assessment area. Summering sheep have also been observed in the upper and middle Selway canyon and at high elevations in Meadow Creek.

Klaver (1978) estimated the upper Selway bighorn population at 90 sheep during his investigation in 1975 through 1976. In 1981, bighorn counts indicated a population of 125.

Twenty-nine bighorns were transplanted into the subbasins in 1989 through a cooperative effort between Idaho Department of Fish and Game and the Nez Perce National Forest. By 1998, bighorn population estimates declined to 50 (Toweill, 1999).

Ecology

Bighorn sheep depend on open bunchgrass communities for foraging and prefer south slopes and cliffs in winter. Peek (1988) assessed habitat characteristics of three areas in the Selway drainage that have been historically occupied by bighorn sheep. These are the Eagle Rock and Elevator Mountain area, the 62 Ridge area, and lower Meadow Creek.

Peek rated the Eagle Rock and Elevator Mountain area as the highest quality habitat of the three and concluded that none of the three areas appear capable of supporting large herds; populations of less than 100 should be expected to persist.

Currently, the largest concentration of bighorns in the subbasins is in the upper Selway canyon in winter, between Magruder Mountain and Sheep Creek. The upper Selway herd's summer and fall range is on the east side of the Bitterroot Mountains. The herd migrates to the Selway winter and spring range in late fall.

Departures from Historic Conditions and Current Threats

Bighorn sheep may once have been the most common ungulate in mountainous regions of North America (Toweill and Geist, 1978). The Nez Perce Indians told Lewis and Clark of large numbers of bighorns in the Bitterroots with the greatest density along the main divide.

Winter range condition is a critical factor influencing bighorn sheep survival. Domestic sheep grazed the Selway bighorn winter range prior to 1927 until 1942. Cattle grazed the Montana summer range between 1943 and 1967 (Klaver, 1978). Carrying capacity for bighorns was probably reduced to some extent through grazing by other ungulates.

Klaver found the Selway winter range to be diminished due to fire exclusion and subsequent forest succession, resulting in poor range condition due to overgrazing by bighorns. Overgrazing

can stress sheep and initiate a population crash due to lungworm pneumonia (Demarchi, 1975 in Klaver, 1978).

Fire suppression could also reduce or eliminate montane and subalpine meadows that bighorns depend on for summer range. Bighorns depend on open habitat with long sight distances to avoid predators. The absence of fire in xeric grasslands has facilitated reductions in open habitats as tree cover encroaches.

Weed encroachment is a significant impact to Selway bighorn winter range. Infestations have diminished native bunchgrass forage and reduced the ability of fire to restore bighorn habitat.

Winter is a time of stress for bighorns. Selway lambs suffered approximately 50 percent mortality from December to May during Klaver's (1978) study. Winter snowmobile use occurs on Deep Creek Road 468 and Paradise Road 6223 in bighorn winter range. Use is primarily associated with lion hunting, both commercial and private, and other recreational pursuits. Reportedly, snowmobiles encounter bighorns on Paradise Road (Pauley, personal communication, 2000).

Traffic associated with the spring boating season on the Selway River in bighorn winter and spring range has escalated and is expected to increase each year. New technology has allowed vehicles to penetrate snowdrifts on Nez Perce Pass and access the river portal at Paradise Guard Station earlier in the season. Boating traffic in bighorn winter and spring range now begins as early as April, when bighorns are probably still present on spring range.

Disturbance can cause sheep to vacate their accustomed habitats and seek refuge on terrain where they would normally be rarely found, resulting in loss of habitat. Loss of wintering habitat is the most significant habitat loss to bighorns and typically means a reduction in population size (Geist, 1971 in Klaver, 1978). Conversely, if sheep habituate to human presence on winter range, they may become less wary and more vulnerable to hunters on summer and fall range.

The loss of a sheep population cannot be easily restored to the vacant range. Wild sheep have great difficulty colonizing new or abandoned ranges. They maintain their native home ranges with a "living tradition" based on knowledge of seasonal feeding and travel routes passed down from generation to generation. When these traditions are disrupted due to loss of older, experienced individuals, or other factors, a sheep population can be easily extirpated (Toweill and Geist, 1978). New, transplanted sheep do not have the traditional knowledge of the new range and cannot be expected to effectively utilize it.

In some areas, lungworm infections may predispose bighorn to respiratory bacterial infections. Klaver (1978) found very low lungworm loads in the Selway herd although the herd was 76 percent infected.

Although Native Americans and early settlers historically hunted Selway bighorns, the state of Idaho has never permitted a hunting season on the wintering Selway herd. However, the herd is hunted legally in Montana on the summer and fall range.

ROCKY MOUNTAIN ELK (*Cervus elaphus*)

Status

Status Designation: Federal, management indicator species (USFS Nez Perce National Forest); State of Idaho, game species.

Elk were historically widespread in North America but are now primarily restricted to western regions with small, reintroduced populations elsewhere.

The Rocky Mountain subspecies is designated a management indicator species on the Nez Perce National Forest and is classified as a game species in the state of Idaho.

Long considered the most important elk herd in Idaho, the Selway elk population significantly declined between 1995 and 1999.

Although elk are not rare or imperiled range-wide, the dramatic decline in subbasin populations in the past decade has generated much debate on which factors are most significant. Elk are important to the state economically and measures implemented to restore elk may have significant implications for other subbasin species as well. Elk are also the only subbasin species for which there is consistent population data over a 10-year period.

Ecology

Elk are primarily grazers, but they are habitat generalists and use a diversity of forest types and structures that provide grass, forb, and browse forage. They use climax mesic meadows and early seral communities for foraging in spring through fall. Winter range is their most limiting habitat where they depend on low elevation, warm aspect, snow free environments for available forage, although bulls often winter much higher in elevation than cows and immature elk. Elk also require forest cover for security and thermal regulation. Calving areas are traditional and preferred sites are generally large meadows in close proximity to water and cover. A mosaic of structural diversity with available water, healthy winter range, and adequate security characterizes good elk habitat.

History of Elk in the Subbasin

Historically, elk populations in the subbasins were relatively insignificant until a series of major fire events occurred in 1910, 1919, and 1934, that significantly increased forage availability and population levels in the subbasins.

Before the elk herd expanded in response to the fires, an effort was made to protect the small population. As a result, Idaho County, which includes the entire assessment area, was closed to elk hunting between 1911 and 1917.

When the Idaho Legislature re-opened Idaho County to elk hunting in 1917, it also established a 194,000-acre Selway Game Preserve in which all game animals were protected. By 1936, the herd rebounded and the preserve was again open to hunting (Parsell, 1990).

By 1940, the Selway elk herd may have grown to about 25,000 in response to increased forage and the19-year absence of hunting in the Selway Game Preserve. Eventually the herd exceeded the capacity of its winter range and a major die-off occurred in the winter of 1948 to 1949. When the population recovered, increased hunting pressure followed. As natural forest succession began to shrink foraging habitat, and hunting pressure increased, the population declined again. Subsequent bull-only harvest regulations were imposed and resulted in a more sustainable population in the 1980s (Weaver, 1989).

Departures from Historic Conditions and Current Threats

The severe winter of 1996 and 1997 devastated the greater Clearwater elk herds. The Selway herd within the greater Clearwater basin declined from a population estimate of 5,000 to 3,200 between 1995 and 1999 (Idaho Department of Fish and Game, 2000). Predator populations were at a high level prior to and during the decline. Other factors likely compounding the severe winter effects on the subbasin elk population include forage availability, hunting, and factors influencing bull vulnerability and calf recruitment.

Elk habitat availability is largely a reflection of natural disturbance dynamics, notably fire, in the subbasins. Much of the xeric winter range elk depend on is significantly beyond expected fire return intervals. Fire maintains grasslands and early seral structure that elk require for foraging. Fire invigorates shrubs and initiates re-sprouting, producing additional forage for elk. The upper Selway canyon indicates the most departure from historic fire regimes.

Weed encroachment in xeric, winter range habitats has undoubtedly influenced the availability of native bunchgrass forage for elk. Aggressive species like spotted knapweed, sulfur cinquefoil, and cheat grass have invaded subbasin winter range. Yellow starthistle is common in the lower Middle Fork and Clear Creek ERUs and can be expected to advance into the Selway canyon winter range.

Seventy-eight percent of the subbasins is designated wilderness. Hunted populations of elk in wilderness areas significantly test the Wilderness Act mandate to “leave no lasting trace”. Evidence from the Lochsa elk population and the Sun River population in Montana, both of which occupy wilderness areas at least part of the year, indicates that hunter harvest and associated influences have affected elk population characteristics and disrupted migration patterns (Thomas and Toweill, 1982).

Distribution of elk is significantly influenced by the presence of human activity. Elk will abandon preferred areas during spring, summer and fall when they are disturbed at these sites. High open road densities reduce elk habitat effectiveness. Hunted populations of elk require considerable forest cover to provide effective habitat security (Stalling, 1994).

Bull Vulnerability: Mature bulls are preferred by most hunters and are therefore more vulnerable to mortality during hunting season than other classes of elk. Lack of mature bulls in a herd can disrupt breeding seasons, conception dates, and calf survival. Younger bulls breed later, over a longer time period in the fall, than mature bulls. This results in longer calving seasons with many calves born in late spring. Late born calves spend less time feeding on high quality forage and may enter winter in poorer condition than calves born earlier. Longer calving seasons also make elk calves more vulnerable to predators for longer periods. Mature bulls also maintain social order in a herd and their presence reduces strife, exhaustion, and wounding among bulls and protects cows from harassment by socially inept young bulls (Stalling, 1994).

Research funded by the Forest Service, the Idaho Department of Fish and Game, and the Rocky Mountain Elk Foundation compared bull mortality in areas with low, moderate, and high road densities. Open road density influenced bull mortality significantly. In the high density area, hunters killed nearly two out of three bulls. In the moderate density area, almost half the bulls were taken. In the low road density area, hunters killed less than a third of the bulls. In all three areas, hunters caused 90 percent of the bull mortality. The level of open road density is also negatively correlated with the percent of bulls living to maturity, defined as four and one-half years. An Idaho Department of Fish and Game study found that only five percent of bulls lived to maturity in a high road density area while in a roadless area, 30 percent of the bulls lived to maturity with most reaching 10 years with nearly 35 bulls per 100 cows.

The Idaho Department of Fish and Game has established a bull:cow elk ratio objective of 25 bulls to 100 cows. The Department uses a bull elk vulnerability model to predict bull:cow ratios for various levels of open road density in game management units.

The achievement of the bull:cow ratio objective is a dual responsibility shared by the Forest Service and the Idaho Department of Fish and Game. In order to achieve the 25:100 objective, the Forest Service would manage motorized access for an open road density of 0 to 1.5 miles of road per square mile within the game management units while the Idaho Department of Fish and Game manages hunter density at 3 to 18 hunter days per square mile per season.

Elk Security Associated with Motorized Access: Elk are sensitive to disturbance and avoid roads in all seasons. Individuals exhibit high fidelity to their home range, but may abandon it if excessively disturbed. Road access and intensity of disturbance is generally thought to be more influential to elk than habitat parameters (Unsworth et al., 1993).

Within national forest lands in the subbasins, the highest open road density is four to five m/m^2 and occurs in upper Clear Creek and extends into lower Clear Creek on private land (Map 54). The high-density area in upper Clear Creek also connects with national forest lands west of Pine Knob that have an open road density of two to three miles per square mile and adjacent densities up to two miles per square mile. Open road densities of two to three m/m^2 also occur on national forest lands between Smith Creek and Pete King Creek on the north face of the Middle Fork Clearwater River, and west of the mouth of Meadow Creek in association with Slim’s Camp Road and Falls Point Road.

The highest open road density within the subbasins is concentrated on the state and private non-federal lands in lower Middle Fork and lower Clear Creek ERUs. Of these, the highest density is four to five mi/mi^2 of road and this occurs on a large portion of lower Clear Creek that extends into upper Clear Creek in national forest. Open road density of three to four mi/mi^2 is located primarily on state land on the north face of lower Middle Fork below Woodrat Mountain. Much of the remaining non-federal portion has open road density of two to three mi/mi^2.

Some motorized access closures are frequently breached and resources for monitoring and enforcement are inadequate. Access violations add to actual open road density and elk vulnerability.

Motorized trail access also occurs throughout the non-wilderness portion of the subbasins. Meadow Creek ERU is considered primarily roadless, but 14 of 22 trails are open to motorized use (Map 54). An extensive mesic meadow complex in upper Meadow Creek provides important elk calving habitat and summer range. Motorized use during calving season in late May and early June may be detrimental to calving elk and to calf recruitment. The average annual rate of increase over the last 10 years for wintering elk populations in Meadow Creek is far less than the average for the other combined non-wilderness general management units and the combined wilderness general management units (Table 4.39).

Trails where motor vehicle use is allowed also access important calving habitat on Glover Ridge between the North Selway Face ERU and Gedney and Three Links ERU. This area is known to be the most significant elk calving habitat in the greater Clearwater River basin. A motorized trail in Gedney Creek also accesses important spring calving habitat. Motorized use in these areas during calving season is a potential threat to calving success. These areas and others accessed with motorized trails on the north face of the Selway are also important elk winter and spring range. Wildlife is most vulnerable to the motorized use in these areas on winter range and during hunting season.

Wintering elk are also vulnerable to motor vehicle access. Roads open to snowmobiles on winter range in the lower Selway include Selway Road 223, Fog Mountain Road 319, Indian Hill Road 9720, Falls Point Road 443, and Swiftwater Road 470. In the upper Selway, Deep Creek Road 468 and Paradise Road 6223 are open to snowmobiles on winter range. These routes are groomed with the exception of Selway Road, Fog Mountain Road, and Indian Hill Road. Use varies on the ungroomed roads depending on snow conditions.

Summer Range Conditions: A habitat effectiveness model that considers road density, livestock grazing, and cover-forage ratios is used to evaluate summer elk range outside the wilderness. Summer range habitat effectiveness objectives are established for each elk analysis unit. All three of the analysis units in the Clear Creek ERU do not meet objectives with two substantially below. In the O'Hara and Goddard ERU, five of the analysis units are below objectives with two substantially below. Five other units are above objective with four substantially above. The single analysis unit in Middle Fork Clearwater ERU is just above objective. In Meadow Creek ERU, three units are just above objective and four units are just below.

The lower habitat effective ratings in Clear Creek and O'Hara and Goddard are primarily related to open road density, with cover to forage ratio and livestock grazing secondary in most cases.

Climax meadow habitat provides important elk summer range but is limited in the subbasins. Significant meadow complexes occur in upper Meadow Creek, North Moose, Rhoda Creek, and Goat Creek. These meadows are also valued for campsites and pack stock grazing, which may displace elk and reduce forage availability.

Unauthorized salting is a frequent problem in the backcountry that increases elk vulnerability through habituation and promotes artificial distribution patterns.

The distribution of elk can also be influenced by the distribution of domestic cattle. Two cattle allotments are permitted within the subbasins. Both the Clear Creek and Tahoe allotment in the

Clear Creek and Middle Fork Clearwater ERUs and the Hamby allotment in the O'Hara and Goddard ERU currently meet grazing objectives for utilization, dispersal, and riparian protection. Potential conflicts with elk include displacement and forage reduction.

Winter Range Conditions and Elk Populations: The Forest Service and Idaho Department of Fish and Game cooperated in evaluating the relationship between the average rate of increase in elk populations over the last 13 years and winter range condition in the subbasins (Pauley, High, Koehler, 2000). The Clearwater Region of Idaho Department of Fish and Game conducts winter elk counts and calculates average annual rates of increase (ARI) for populations in game management units (GMUs). Systematic aerial counts have been conducted for the 13-year period from 1988 through 2000 (Pauley, 2000).

Aerial counts are made of the sub-units within game management units. The sub-unit counts were grouped according to the ERU they fell within, so average annual rates of increase by ERU could be calculated. Some sub-units were winter counted more frequently than others and some ERUs contained only one sub-unit from which rates were derived for the whole ERU in general.

When an ERU, such as one of the canyon ERUs, had distinct north-south or east-west faces, scientists looked at the ERU as a whole and also looked at the two faces individually. This is important because south and west aspects receive more insolation, are warmer and characteristically provide better winter range conditions than north and east aspects. However, roads are often located on south and west aspects because of less snow load and fewer trees. Motorized traffic on these roads can decrease use of winter range.

Although elk generally exhibit high habitat fidelity, in extreme winter conditions they may be forced to move from traditional winter range in search of better conditions. This could influence winter counts in years with extreme winter conditions.

Table 4.39 depicts average ARIs for four elk population classes within each sub-basin ERU and the year's winter counts were conducted. The ERUs and associated ARIs are grouped into three categories:

- *Front Country* - includes all roaded non-wilderness ERUs in the sub-basin.
- *Meadow Creek* - consists of a single ERU that is designated roadless with motorized trails and is the second largest ERU in the sub-basin.
- *Wilderness* - includes all wilderness ERUs that are primarily roadless except for a few road corridor inclusions.

As shown in Table 4.39, the four elk population classes evaluated are the calf:cow ratio, and the cow, bull, and total elk population classes. The calf:cow ratio is important as an indicator of population recruitment and long term herd viability. A ratio of at least 24 calves to 100 cows is needed to offset natural mortality. Since bulls are more vulnerable to hunting and often use higher elevation winter habitat than other elk classes, the bull class warrants individual evaluation. The cow class is the largest and is useful as an indicator of the status of the general elk population. The total elk class is a combination of all elk classes including immature cows and bulls, and calves.

Twelve of the 19 ERUs evaluated were found to have significant numbers of wintering elk. The 7 ERUs found to have less significant numbers are primarily limited by high elevations and lack of adequate winter range habitat. These ERUs provide valuable summer range, however.

Upper Selway Canyon, Middle Selway Canyon, Meadow Creek, Lower Selway Canyon, Middle Fork Clearwater River, and Clear Creek ERUs, in order of significance, support the highest numbers of wintering elk in the sub-basin.

Across the 12 significant ERUs, average ARI ranges vary considerably for each elk population parameter evaluated. For the calf:cow ratio, the average ARI range is 64.2 percent to –9.0

percent. For bulls the range is 0.3 to –15.1. For cows, it is 25.5 to –18.1, and for total elk, the range is 14.2 to –17.5.

Table 4.39: Elk Winter Population Data by Ecological Response Unit and Annual Rate of Increase (Percent)

Front Country ERUs	Calf:Cow	Cow	Bull	Total Elk	Years Surveyed*
Clear Creek	-3.4	-18.1	-11.1	-17.5	93, 96, 00
Lower Selway Canyon	5.9	8.2	-5.2	3.7	93, 96, 00
Lower Selway Canyon - North Side of the River	0.8	5.5	-13.2	-3.3	93, 96, 00
Lower Selway Canyon – South Side of the River	13.9	12.5	1.4	13.1	93, 96, 00
Middle Fork Clearwater River	2.7	7.6	-1.1	2.1	85-88, 91-96, 99, 00
MFCR – North Side of River	2.7	7.2	-0.8	1.9	85-88, 91-96, 99
MFCR – South Side of River	no data	23.2	-4.3†	10.5	93, 96, 00
North Selway Face	0.8	5.5	-13.2	-3.3	93, 96, 00
O'Hara and Goddard Creeks	5.9	-4.3	-1.3	-3.6	93, 96, 00

Meadow Creek ERU	Calf:Cow	Cow	Bull	Total Elk	Years Surveyed*
Meadow Creek	-9.0	-7.3	-9.6	-8.3	88, 91, 93, 95, 96, 99, 00

*Only a portion of each ERU was surveyed each year.

† Data was available from only one Game Mgmt. subunit. May apply to a whole ERU or a single rate calculation.

Wilderness ERUs	Calf:Cow	Cow	Bull	Total Elk	Years Surveyed*
Deep Creek	-57.0†	-29.2	25.8	-17.2	88, 95, 99
Ditch Creek†	-11.8	-5.9	-33.0	-11.0	91, 95, 99
Gedney and Three Links Creeks	12.0	-9.4	-3.2	-10.8	88, 91, 93, 95, 96, 99, 00

Wilderness ERUs	Calf:Cow	Cow	Bull	Total Elk	Years Surveyed*
Indian Creek	12.7	-4.0	-18.5	-3.8	91, 95, 99
Marten Creek†	0.0	-1.7	17.0	1.8	91, 95, 99
Middle Selway Canyon	-0.6	-6.6	-11.5	-8.0	88, 91, 93, 95, 96, 99, 00
Middle Selway Canyon – North Side of the River	0.3	-8.2	-10.3	-9.1	88, 91, 95, 99
Middle Selway Canyon – South Side of the River	-3.6	-1.8	-14.6	-4.4	88, 91, 93, 95, 96, 99, 00
Moose Creek	-7.0	-10.4	0.3	-10.9	88, 91, 95, 99
Otter and Mink Creeks	13.5	-12.4	-19.9	-14.3	88, 91, 95, 99
Pettibone and Bear Creeks	6.3	6.1	-15.1	1.0	88, 91, 95, 99
Running and Goat Creeks	-0.1	0.5	-13.5	-0.7	88, 91, 95, 99
Selway Headwaters	-4.4	-11.9	-3.3	-11.5	88, 91, 95, 99
Selway Headwaters – East Side of the River	2.3	-11.4	2.8	-9.2	88, 91, 95, 99
Selway Headwaters – West Side of the River	-28.7	-13.6	-18.1	-19.3	88, 91, 95, 99
Upper Selway Canyon	-1.7	-2.1	-4.3	-3.7	88, 91, 95, 99
Upper Selway Canyon – East Side of the River	-2.4	-1.2	-5.8	-3.0	88, 91, 95, 99
Upper Selway Canyon – West Side of the River	2.3	-7.2	-0.7	-7.1	88, 91, 95, 99
White Cap Creek	64.2	25.5	-8.3	14.2	88, 95, 99

***** Only a portion of each ERU was surveyed each year.

† Data was available from only one Game Mgmt. subunit. May apply to a whole ERU or a single rate calculation.

The following summary Table 4.40 consolidates the ERUs and associated ARIs within the front country, Meadow Creek, and wilderness categories.

Table 4.40: Wintering Elk Population Annual Rates of Increase by GMUs Selway and Middle Fork Clearwater Subbasins

	Calf:Cow ARI (%)	Cow ARI (%)	Bull ARI (%)	Total Elk ARI (%)
Front Country (GMUs 10A, 12, 16)	3.5	-1.0	-6.3	-3.7
Meadow Creek (GMU 16A)	-10.2	-8.6	-11.7	-9.9

Wilderness (GMU 17)	-0.1	-3.2	-6.6	-4.8

GMU: Game Management Unit; ARI: annual rates of increase

Notes for Table 4.40: Only those subunits within the Selway and Middle Fork subbasins analysis area were used to compile these composite ARIs. Only small portions of GMU 10A and GMU 12 fall within the analysis area. A portion of Unit 16A lies outside the Meadow Creek watershed.

Table 4.41: Findings by Elk Population Class - Annual Rates of Increase by Percent

The two ERUs with the highest annual rates of increase and the two ERUs with the lowest ARIs for each elk population class are shown below. A single ERU that represents the mid-range ARI for each elk population parameter is also shown.

High ARI Range ERUs	**Calf:Cow**	**Cow**	**Bull**	**Total Elk**
White Cap Creek	64.2%	25.5%		14.2%
Moose Creek			0.3%	
Gedney and Three Links Creeks	12.0%			
Lower Selway Canyon		8.25%		3.7%
Middle Fork Clearwater			-1.1%	
Mid ARI Range ERUs	**Calf:Cow**	**Cow**	**Bull**	**Total Elk**
Upper Selway	1.7%	2.1%		-3.7%
Lower Selway Canyon			-5.2%	
Low ARI Range ERUs	**Calf:Cow**	**Cow**	**Bull**	**Total Elk**
Moose Creek	-7.0%			
Selway Headwaters		-11.9%		-11.5%
Running and Goat			-13.5%	
Meadow Creek	-9.0%			
Clear Creek		-18.1%		-17.5%
Pettibone and Bear			-15.1%	

White Cap Creek ERU appears to have the highest ARI for all elk classes except for bull, which is mid range (Table 4.41). Limited survey data may have influenced the very high calf:cow, cow, and total elk ARI in White Cap Creek ERU. Two sub-units were surveyed (flown) in 1995 and 1999 and another sub-unit was flown only in 1988. Idaho Department of Fish and Game winter surveys in 1999 noted that elk were using recently burned areas on the south face of White Cap Creek rather than on the warmer north face. The north face, where potential winter range is concentrated, is reportedly infested with spotted knapweed and very little grass forage remains (Pauley, 1999). Xeric habitats in White Cap Creek ERU are significantly beyond the expected fire return interval and winter use of the area may have significantly increased as a result of the recent burns.

Gedney and Three Links Creeks ERU has the second highest calf:cow ARI and has the third highest bull ARI. Glover Ridge bounds the ERU on the west and is known as the most important calving area in the greater Clearwater River basin. Extensive meadows with adjacent forest cover at low elevations provide high quality calving habitat. The cow ARI for Gedney and Three Links Creeks is in the low range. The high calf:cow ratio increase could be a reflection of the drop in cows. Gedney and Three Links fire return intervals in the xeric habitats are closer to historic than many other ERUs in the sub-basin. The Boyd-Glover NRA Trail # 703 on Glover Ridge is open to motorized vehicle access yearlong. Although currently the area is thought not to receive substantial use during calving season, the potential for increased activity is significant.

Lower Selway Canyon has the second highest cow and total elk ARI and is in the lower end of the high range for calf:cow and is mid range for bulls. It is the lowest elevation ERU with the least snowfall in the Selway canyon. Fire intervals in xeric habitats in this ERU are not as far beyond expected return as many other ERUs in the sub-basin. It is notable that most of the winter population occurs on the south side of the Selway, and not the north, which would be expected. The north side of the canyon is comprised of xeric winter range habitats while the south side is more mesic. Selway Road, open to motorized vehicles year long, is located on the north side and may be a factor influencing winter elk use on that side of the canyon. The dry, north side is also heavily infested with spotted knapweed and other noxious weeds that decrease grass forage and may also contribute to loss of winter range habitat there.

Moose Creek has the highest bull ARI of the 12 ERUs evaluated. The ARI for the other elk classes in Moose Creek are lower than the average for the wilderness ERUs. Although Moose Creek does not have extensive xeric, low elevation winter range, bulls typically winter higher in elevation than cows and immature elk, which may be reflected in the relatively high ARI. Another influential factor may be the 6-year absence of the outfitter operation that was permitted to hunt the largest outfitter area in the ERU.

Moose Creek has the second lowest calf:cow ARI. An important calving area occurs on East Moose Creek at Moose Creek Ranches. Until 6 years ago, an outfitter base camp was situated at the Ranches. Spring bear hunts coincide with elk calving in the area with unknown influences. Moose Creek is in the low range ARI for cows and total elk. Extensive unauthorized salting has probably influenced the distribution and vulnerability of elk in Moose Creek. Meadow habitats in Moose Creek are less well represented than historically, probably due to fire exclusion. Mesic meadows in East Moose, Rhoda, and North Moose Creeks areas are important for elk calving and summer range. The meadows are also valued for camping and pack stock grazing and the significance of potential impacts to elk is unknown.

Mountain lion and black bear populations were at high levels in the subbasins until 1997, when they began to decline (Nadeau, 1999). Although they are hunted in the subbasins, their influence on elk populations may have also contributed to population declines.

Middle Fork Clearwater ERU has a significant winter elk population and has the second highest bull ARI of the 12 important winter range ERUs. It is also in the high range ARI for cows and total elk and in the mid range for calf:cow. All elk classes except calf:cow have higher ARI than the average for the front country ERUs combined. Most of the elk in Middle Fork winter on national forest lands between Lowell and Little Smith Creek at Syringa. Fire return intervals are less inconsistent with historic intervals than in many other ERUs.

Meadow Creek ERU has the lowest calf:cow ARI of the 12 ERUs. Meadow Creek bull, cow, and total elk ARI are in the low end of the mid range for the ERUs. All elk classes in Meadow Creek have a significantly lower ARI than the average for the combined front country ERUs and for the combined wilderness ERUs. Potential factors influencing elk populations in Meadow Creek may be associated with disturbance from motorized use in calving areas and summer range in upper Meadow Creek and on winter range in lower Meadow Creek. Past high predator populations may also be important. The Selway wolf pack has hunted Meadow Creek since 1996. Beginning with one pair, the pack has since reproduced. Xeric habitats are rare in Meadow Creek and are

somewhat beyond the expected fire return interval. Early seral forage has declined as tree canopy density has increased. Wintering elk also use the low elevation mesic habitats in Meadow Creek. These habitats are significantly beyond the expected fire return interval and important recently burned habitat is absent due to fire exclusion.

Clear Creek ERU has the lowest ARI for cows and total elk of the 12 ERUs evaluated (Table 4.41). All elk classes in Clear Creek have a significantly lower ARI than the average for the combined front country ERUs (Table 4.41). The Clear Creek bull ARI is in the high end of the low range for bulls. Most of the wintering elk in the Clear Creek ERU are found surprisingly high in elevation on national forest lands in Middle Fork Clear Creek and Solo Creek and in upper Clear Creek. This elk wintering area is an island of low open road density, which would not be an expected influence in winter. But the Clear Creek ERU does have some of the highest open road densities in the subbasins, which undoubtedly contribute to the low ARI. The high road density also influences elk summer range habitat effectiveness in Clear Creek, which is substantially below objective. The lower portion of the ERU is developed private and state land and has the highest road densities in the subbasins. Winter snowmobile recreation is common in Clear Creek. Extensive weed encroachment has also significantly impacted winter range. Recently burned habitat that is important for foraging is absent due to fire exclusion.

The Selway Headwaters ERU has the second lowest ARI for both cows and total elk. The calf:cow ARI is in the low range and bull ARI is in the low end of the high range. The ARI for all elk classes except bull is much lower than the average for the combined wilderness ERUs. This ERU is not characteristic of important winter range because of high elevation and marginal representation of xeric habitats. As the ARI indicates however, bulls fare better here and it is probably because they are known to winter at higher elevations than cows and immature elk classes. Xeric habitats in Selway Headwaters are somewhat beyond the expected fire return interval.

Pettibone and Bear Creeks ERU bull ARI is the lowest of the 12 ERUs and is significantly lower than the average bull ARI for the combined wilderness ERUs. Calf:cow, cow, and total elk classes are in the lower end of the high range ARI in the ERU. The ARI for these classes are higher than the average for the combined wilderness ERUs. Pettibone and Bear Creeks ERU is heavily hunted with reportedly high success rates, which may be the major influence on the dramatically low bull ARI compared to other elk classes. Indian Lake-Horsefly Meadows in the headwaters is an important elk calving area and summer range between winter ranges in East Moose and Pettibone Creeks. An outfitter camp occupies these meadows in summer and fall. Weed encroachment and reduction in early seral forage due to fire exclusion have influenced winter range availability in the ERU.

Running and Goat Creeks ERU has the second lowest bull ARI of the 12 ERUs and is much lower than the average bull ARI for the combined backcountry ERUs. Calf:cow, cow, and total elk classes are in the mid range ARI in Running and Goat Creeks ERU. The disparity in bull ARI may be due to hunting influence. Twenty-one percent of Running and Goat Creeks is xeric habitat characteristic of potential winter range. Xeric habitats in the ERU have very frequent fire regimes and are significantly beyond expected fire return intervals. Weed encroachment is also extensive. Mesic meadows in the uplands provide potential elk calving and summer range. Significance of the use of these meadows for camping and pack stock grazing is unknown.

MULE DEER *(Odocoileus hemionus)*

Status

Status Designation: Federal, not listed; State of Idaho, game species.

The mule deer is found throughout western North America in association with mountains and river breaks habitat.

Winter mule deer counts in the subbasins were conducted by the Idaho Fish and Game Department in 1995 and 1999 and reflect a stable population between the two years. The total population estimate in 1995 was 903 and the 1999 estimate was 902. Within individual ERUs, however, population levels did fluctuate between survey years. Fourteen of the 19 ERUs were surveyed including all wilderness ERUs and Meadow Creek ERU. Mule deer were counted in at least one year in all surveyed ERUs except Otter and Mink. Upper Selway Canyon ERU has the largest winter population, estimated at almost 560 deer in both 1995 and 1999. In Middle Selway Canyon ERU, with the second largest population, 129 deer were estimated in 1995 but only 73 deer were counted there in 1999. The Ditch Creek population declined from 64 deer in 1995 to 46 in 1999. Six other ERUs with smaller populations increased and populations in four ERUs declined between 1995 and 1999.

Ecology

Habitat use of mule deer varies regionally and also by season within a region. In most areas of its range, mule deer are seasonally migratory, moving from high elevations during summer and fall to lower elevations during winter and spring. Mule deer in the subbasins are primarily associated with xeric, steep and rocky shrublands on the Selway river breaks.

Mule deer also use ponderosa pine, Douglas-fir, larch, and subalpine fir forests. They prefer to bed in conifer cover during the day and feed in open shrub-grassland habitats during in the evening and at night. During summer and seasonal migrations, they may range into alpine areas. Mule deer avoid habitats occupied by white-tailed deer.

During winter and spring, mule deer are associated with south-facing slopes at low elevations. Food habits vary seasonally from grasses and forbs during spring and summer to shrubs during fall and winter (Mackie et al. 1982; Pac, 1976).

Mule deer home range size varies from 90 to 600 acres or more, depending on habitat quality. An Idaho study (Brown, 1992) found deer showed high fidelity to summer range, but less to winter range, as the Idaho Department of Fish and Game winter survey data suggest. While population size in the subbasins was stable between 1995 and 1999, population size within individual ERUs fluctuated.

Departures from Historic Conditions and Current Threats

Mule deer were much more plentiful than elk in the Selway country and numbered in the thousands as early as 1900 (Parsell, 1938 in McCulloch, 1953). Large mule deer herds migrated from winter range along the Selway River to summer range on the Montana side of the Bitterroots, and in the reverse direction every fall. Nez Perce Pass, the White Cap Creek-Rock Creek divide, and other locations along the Bitterroot divide were traditional deer migration routes. Although herds are smaller, these migrations reportedly still occur (Ormiston, 2000). Mule deer were also numerous along the Selway above Selway Falls in 1924 (Thomas, 1924 in McCulloch, 1953). Between 1927 and 1936, the mule deer population crashed due to apparent over-use of winter range. The elk population significantly increased after the mule deer decline.

Mule deer habitat availability is largely a reflection of natural disturbance dynamics, notably fire, in the subbasins. Much of the xeric winter range mule deer depend upon is significantly beyond expected fire return intervals. Fire maintains shrubs and early seral habitat that mule deer require for foraging. Fire invigorates shrubs and initiates resprouting, producing additional forage for mule deer. Upper Selway Canyon, the ERU preferred most by wintering mule deer, indicates the most departure from historic fire regimes.

Weed encroachment in xeric, winter range habitats has undoubtedly influenced the availability of native forage for mule deer. Aggressive species like spotted knapweed, sulfur cinquefoil, and cheat grass have invaded subbasin winter range. Yellow starthistle is common in the lower Middle Fork and Clear Creek ERUs and can be expected to advance into the Selway canyon winter range.

Wintering mule deer are vulnerable to the affects resulting from motorized vehicle access. Roads open to snowmobiles on winter range in the lower Selway include Selway Road 223, Fog Mountain Road 319, Indian Hill Road 9720, and Falls Point Road 443. In the upper Selway, Deep Creek Road 468 and Paradise Road 6223 are open to snowmobiles on winter range. These routes are groomed with the exception of Selway Road, Fog Mountain Road, and Indian Hill Road. Use varies on the ungroomed roads depending on snow conditions.

Most hunters prefer to hunt mature bucks, which are therefore more vulnerable to mortality during hunting season than other classes of mule deer. Lack of mature bucks in a herd may disrupt breeding seasons, conception dates, and fawn survival. Younger bucks may breed later over a longer time period in the fall than mature bucks. This results in longer fawning seasons with many fawns born late in the season. Late born fawns spend less time feeding on high quality forage and may enter winter in poorer condition than fawns born earlier.

MESIC HABITATS AND ASSOCIATED SPECIES

Mesic habitats are the most common habitat aggregation and represent 74 percent of the subbasin habitats (Maps 50 and 52). They are less common in the upper Selway and lower Middle Fork Clearwater and lower Clear Creek areas. Key habitat features in the mesic aggregation include riparian zones and streams, mesic shrublands and meadows, and mesic old growth, including western red cedar.

Mesic habitats include habitat type groups (HTGs) 3 to 9. Habitat type groups 3 and 4 are characterized by moderately cool and xeric grand fir and moderately warm and moist grand fir habitats. Species characteristic of this habitat include grand fir, Douglas-fir, lodgepole pine, Engelmann spruce and occasionally ponderosa pine and western larch. Understories range from beargrass and huckleberry to more diverse shrub and forb understories. These HTGs are found at mid elevations on ridges or rolling hills in the south and east parts of the subbasins and on north slopes and lower slopes in areas that are too xeric for western red cedar.

Habitat type groups 5 and 6 consist of moderately cool and moist and moderately cool and wet western red cedar types. In addition to western red cedar, these habitats support grand fir, Douglas-fir and secondarily, western white pine, ponderosa pine, and western larch. Understories range from diverse shrub to fern and herb understories. These HTGs occur in the west part of the subbasins on lower slopes and north aspects and the wet habitats are generally limited to riparian areas along streams and moist lower slopes in the western part of the subbasins.

Habitat type groups 7, 8, and 9 are characterized by cool and moist, cool and wet, and cool and moderately dry subalpine fir habitats. They are dominated by stands of subalpine fir, Engelmann spruce, and lodgepole pine with western larch, whitebark pine, and Douglas-fir less common. The cool and moist subalpine fir is common at upper elevations on north aspects and moist lower slopes. The cool and wet subalpine fir is uncommon and occurs at upper elevations in riparian areas. Cool and moderately dry subalpine fir is very common at upper elevations on ridges and southerly aspects. The following table describes the elements of the mesic habitat aggregation.

Table 4.43: Mesic Habitat Aggregations

Mesic Habitats				
Structure	Early Seral	Mid-seral	Late Seral	Old Growth
Potential Vegetation	HTG 3-9	HTG 3-9	HTG 3-9	HTG 3-9
Size Class	Herbaceous, shrub, seedling, sapling, pole	9-21 in. dbh	$\geq$ 21 in. dbh and not old tree	Old tree

dbh=diameter at breast height

Current Departures from Historic Conditions

Fire exclusion has reduced early seral habitat conditions. Climax meadow and early seral habitats at both low and higher elevations, once maintained by fire, have decreased, resulting in reduced forage for ungulates. Shrublands have also declined. Mesic old growth has been fragmented by timber harvest in the subbasins but is generally better represented across the subbasins than in presettlement times as a result of fire suppression. Patch size diversity has sharply declined and canopy densities have changed in some cases. Timber harvest units have been left with little standing and down dead wood habitat components. Recently burned habitats that provide unique elements like insect infestations, standing and down dead wood components, and early seral forage are absent due to fire exclusion.

Representative Species Associated with Mesic Habitats:

- Carnivores: Gray wolf, lynx, fisher
- Forest birds: Great gray owl, goshawk, brown creeper, black-backed woodpecker
- Riparian birds: Bald eagle, harlequin duck
- Amphibians: Coeur d'Alene salamander, Pacific Giant salamander, tailed frog
- Reptiles: Ring-necked snake
- Ungulates: Shira's moose

GRAY WOLF *(Canis lupus)*

Status

Status Designation: Federal, endangered, experimental-nonessential (U. S. Fish and Wildlife Service) and management indicator species, Nez Perce National Forest (USFS); State of Idaho, not listed.

All wolves in central Idaho are classified as "endangered-experimental-nonessential" under provision 10j of the Endangered Species Act. The gray wolf is designated as a management indicator species on the Nez Perce National Forest.

Wolves were respected and frequent subjects of Nez Perce legends but early settlers viewed them, as do many people today, as competition for game and threats to livestock. Gray wolves historically occurred in the subbasins and throughout Idaho but were largely eliminated through shooting and trapping from all of north-central Idaho by the 1930's (Hansen 1986). Their current range south of Canada includes northwestern Montana, central and northern Idaho, northeastern Minnesota, northern Wisconsin, Michigan's Upper Peninsula, and the Cascade Mountains of Washington near the Canadian border. Since reintroduction was initiated in Idaho in 1995, individual, introduced wolves have been radio tracked to eastern Oregon as well.

By the late 1980s, wolves were moving southward as populations expanded in Canada and they subsequently inhabited northern Montana. Many wolf track reports, sightings, and howling reports throughout the subbasins were documented in the late 1980s and early 1990s following the expansion of the Canadian wolf populations and subsequent occupation of northern Montana.

In 1995 and 1996, the U. S. Fish and Wildlife Service introduced gray wolves into north-central Idaho along the Middle Fork Salmon River in the adjacent Frank Church River of No Return Wilderness Area. As a result, all wolves in central Idaho were classified as "experimental-nonessential" under provision 10j of the Endangered Species Act.

Wolves are successfully reproducing in central Idaho today. Since the reintroduction, there have been several documented sightings of collared wolves in the subbasins during aerial tracking surveys. At least two packs have established in the subbasins.

The subbasins lie within the Central Idaho Wolf Recovery Area established by the USFWS Northern Rocky Mountain Wolf Recovery Plan (1987). Kaminski and Hansen (1984) identified the

Selway-Bitterroot Wilderness Area as one of five areas that is key to the conservation of wolves on the Nez Perce National Forest. Ungulate winter range along the Selway River is believed to be the most important habitat component available to wolves in the Wilderness. East Fork Moose Creek, a tributary of the Selway River, is known as a historically important wolf travel corridor between the Selway and the Bitterroots.

Ecology

Although gray wolves depend on xeric winter range habitat for prey in winter, they are habitat generalists and use mesic habitats extensively.

Key components of wolf habitat include sufficient year round prey, suitable and somewhat secluded areas for raising pups, and sufficient space with minimal exposure to humans (Kaminski and Hansen, 1984).

Wolf homesites include both denning and rendezvous sites. Den sites are typically located on moderately steep, well-drained southerly aspects with a view of surrounding terrain within 400 yards of water. Wolves may dig out or visit whelping dens weeks before the birth of pups. In the Northern Rockies an average of six to seven wolf pups are born between late April and early May. Some dens or denning areas may receive traditional use by a wolf pack over time. Most wolves appear particularly sensitive to human activity near den sites and may abandon them if disturbed.

Rendezvous sites are specific resting and gathering areas occupied by wolf packs during summer and early fall after the whelping den has been abandoned. They are characterized by matted vegetation in a meadow, a system of well-used trails through the adjacent forest and across the meadow, and resting beds adjacent to trees. A wolf pack will usually move from the whelping den, or occasionally a second den, to the first rendezvous site when the pups are six to 10 weeks of age in late May to early June.

The first rendezvous site is often within one to six miles of the whelping den. A succession of rendezvous sites is used by the pack until the pups are mature enough to travel with the adults in September to early October. Rendezvous sites, especially the first one, may receive traditional use by wolf packs. It is at the initial rendezvous site that wolves appear most sensitive to prolonged or substantial human disturbances.

Wolves prey selectively upon the newborn and young of moose, elk, and deer in calving and fawning areas during May and June. Although the actual locations of such areas may vary from year to year, depending on weather and snow conditions, many receive traditional use by ungulates. Ungulates comprise more than 90 percent of wolves' diets during summer and fall in the Rocky Mountains. Mule and white-tailed deer, elk, and moose are the principal prey species. During winter, wolves in the Rockies prey almost exclusively upon deer, elk, and moose. Winter range is typically the limiting factor for ungulate populations according to the Northern Rocky Mountain Wolf Recovery Plan (USFWS, 1987).

The subbasins are primarily wilderness and provide large expanses with relatively little human disturbance. Available prey species include deer, elk, moose, bighorn sheep, and mountain goat. The wide valley bottom of East Moose Creek and numerous mesic meadows provide favored wolf travel ways and denning and rendezvous sites (U. S. Fish and Wildlife Service, 1994).

Departures from Historic Conditions and Current Threats

Threats to wolves in the subbasins include reduced habitat security and increased mortality risks related to roads, trails, and human intrusion into habitats.

Activities near active dens or rendezvous areas are considered potentially most able to affect reproducing wolves. Wolves often favor mesic meadows for homesites. These meadows are also valued for campsites and pack stock grazing in the subbasins.

In the North Fork of the Flathead River drainage, at least 13 of 14 known mortalities were human-caused (Pletscher et al., 1991). An examination of percent mortality by region in Minnesota showed an inverse relationship between human density, road density, and viable wolf populations (Thiel, 1985). Wolves may be intentionally shot or mistakenly shot when confused with coyotes, which can be killed legally.

Timber harvest, fire suppression, weed encroachment, livestock grazing, recreation, motorized use, and other human activities can reduce the quality and availability of suitable habitats for wolves and their prey. Fire exclusion has reduced early seral ungulate prey habitat conditions that were historically maintained by varying fire intensities and intervals. Climax meadow and early seral habitats at both low and higher elevations, once maintained by fire, have decreased, resulting in reduced forage for elk, deer, and other ungulate prey.

CANADA LYNX *(Lynx canadensis)*

Status

Status Designation: Federal, threatened (U. S. Fish and Wildlife Service); State of Idaho, species of special concern.

Lynx range throughout Alaska and Canada, south through the Rocky Mountains, northern Great Lakes, and northern New England. The range of the lynx in the western United States has diminished over the last century, suggesting that lynx may be negatively impacted by development. Because suitable habitats are more fragmented and restricted in extent in the western mountains, lynx may be less tolerant of human activities here than in Canada and Alaska, where refuge habitats are more prevalent. Providing protected areas within optimal lynx habitat in the western mountains may be important for the persistence of lynx populations (Ruggiero, et al. 1994).

Review of historic and current records indicate that lynx sightings are rare but do infrequently occur on the Nez Perce National Forest and in the Selway and Middle Fork subbasins. In 1998, a Forest Service trail crew foreman observed a lynx at Magruder Guard Station in the Selway Headwaters ERU. An unconfirmed lynx sighting was reported in late January 1993, near Lowell, Idaho within the assessment area. In recent years, winter lion hunters have reported lynx tracks in the adjacent Lochsa River canyon (Gilmore, 1999). A lynx sighting near Mount Idaho in the neighboring South Fork Clearwater canyon was reported in August 2000. Another lynx was reported in the Salmon River canyon near Slate Creek in 1998 (Anglen, 1998). In two other separate incidents, lynx were observed in the Salmon River canyon in 1987 (High,1987).

Historic records indicate lynx were trapped and killed for many years within the Moose Creek Ranger District in the Selway-Bitterroot Wilderness. Lynx may have been numerous in Lynx Creek at some point in time. But the only documented count, found in *Moose Creek Ranger District Historical Information Inventory and Review, Nez Perce National Forest* (USFS, 1988), estimates 30 lynx in Moose Creek in 1946.

Ecology

Lynx typically occupy habitats in Idaho occurring at elevations above 4,000 feet. However, lynx observations occur at lower elevations on the Nez Perce National Forest (High, 1987). In northwestern Montana, most relocation for two radio-collared lynx were in young, dense, lodgepole pine. Ninety percent were in stands generated by the 1910 fires, and the rest were in mature Douglas-fir and western larch riparian stringers within the burn (Koehler et al., 1979). Xeric sites where lodgepole pine was dominant contained 88 percent of the locations in the 1910 burn. The other three locations were in mesic sites dominated by subalpine fir and Engelmann spruce.

Lynx utilize Engelmann spruce, subalpine fir, or lodgepole pine habitats that provide a mosaic of forest age classes. They require early successional habitats for foraging and forested habitats for security, cover, and denning. Lynx require cover for stalking and security, and usually do not

cross openings wider than 300 feet (Koehler and Brittell, 1990). Early successional habitats or forest age classes of approximately six years or older, occurring in at least 20 to 25 acre patches provide optimum lynx foraging habitat. Foraging habitat can best be evaluated by assessing snowshoe hare habitat. Koehler (1990) found that lynx prey almost exclusively on snowshoe hares.

Snowshoe hares have a home range of 20 to 25 acres and require both forage and thermal cover. The limiting habitat factors for snowshoe hares are winter forage including willows, birch, and conifers and thermal cover. Snowshoe hare thermal and security cover is characterized by conifer stands with greater than 3,000 stems per acre and tree heights of six feet or greater (Koehler and Brittell, 1990). In northwestern Montana, snowshoe hares were most abundant in densely stocked stands of lodgepole pine less than 80 years old (Koehler et al., 1979). To avoid predators and extreme cold, snowshoe hares may select thermal and security cover over foraging habitats (Monthey, 1986).

Lynx are physiologically adapted to disperse their weight on wide paws enabling them to travel on the surface of deep snow, as do snowshoe hares, their primary prey. Because of this adaptation, other predators that compete with them for food are normally isolated from lynx winter habitat.

Lynx denning habitat can be characterized as mature forests with mesic habitat associations on north and northeast aspects. Denning sites require a high density of logs on the ground; the logs need to be one to four feet above the ground (Koehler, 1990). Down logs and stumps are important for denning habitat because they provide cover for kittens. Denning stands are between one and five acres, and are connected by travel corridors through mature forest also provide access to prey habitat.

Potential lynx denning habitat is abundant in mesic habitats in the upper elevations of the subbasins. Lynx are strongly associated with lodgepole pine habitats and the best representation occurs in upper Meadow Creek. The best potential habitat is where patches of old growth lodgepole denning structures are adjacent to early and mid-seral foraging habitat.

Lynx require forested cover to provide security and facilitate hunting success. Lynx usually will not cross openings greater than 300 feet (Koehler and Brittell, 1990). Sufficient cover is provided in stands with 180 trees per acre with a minimum tree height of 6 feet (Koehler, 1990). Favored travel routes are forested areas along ridges and saddles.

When prey is scarce, lynx home range size increases and individuals may become nomadic. The home range of males is larger than that of females. In the western U. S., home range size is usually between nine to 18 square miles. Population density is usually less than 10 lynx per 39 square miles, depending on prey availability. Individuals are usually solitary.

Departures from Historic Conditions and Current Threats

Timber harvest may diminish denning habitat and travel routes along forested ridges and saddles. Timber harvest has fragmented potential lynx denning habitat in the Middle Fork Clearwater, Clear Creek, and O'Hara and Goddard ERUs. Currently, old growth and early seral structures are under-represented and mid-seral structure is more extensive compared to historic conditions as a result of timber harvest and fire exclusion.

Salvage logging and woodcutting in blowdown areas in potential lynx denning habitat directly impacts denning habitat, which requires large diameter, jackstrawed deadfall. Thinning may impact foraging habitat or future denning habitat.

Roads may increase the vulnerability of lynx to hunters and trappers (Bailey et al., 1986; Todd, 1985). Snowmobile travel routes that access high elevations may provide access to lynx habitat to competing predators who follow these snow-compacted routes.

Lynx may be intentionally shot or mistakenly shot when confused with bobcats, which can be killed legally. Lynx have also been trapped in bobcat traps.

Use of explosives for trail construction near den sites may be detrimental to denning lynx.

FISHER (*Martes pennant*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species/management indicator species in the Nez Perce National Forest (USFS); State of Idaho, species of special concern and protected nongame species.

The fisher is a Forest Service Northern Region sensitive species and also listed as management indicator species by USFS, as candidate (C2) by USFWS, and a protected nongame species in Idaho. The fisher occurs throughout much of Canada, south through the Rocky Mountains, in the northern Great Lakes Region, and New England.

Fisher populations declined significantly in the early 1900s. The decline is largely attributed to habitat loss through settlement and logging, over-trapping, and predator poisoning, and the extensive fires that burned in north-central Idaho between 1910 and 1934 (Jones, 1991). Fishers were extirpated from Idaho but were successfully reintroduced to three north-central Idaho sites in 1962 and 1963. Western populations remain at low levels.

Several fisher observations are documented in the subbasins. Two reports of fishers on East Moose Creek in August 1992, and fisher tracks observed on snow, also on East Moose Creek, in January 1993, are documented. Three reports of fishers on the north side of the Middle Fork Clearwater River between 1998 and 2000 are also recorded. A fisher family is commonly seen crossing Highway 12 to access the Middle Fork Clearwater River. Fisher tracks on snow were observed in the uplands of the O'Hara and Goddard ERU in 1994 and 1999 (High, 2000).

Ecology

In the west, fishers are usually found in coniferous forests including diverse habitat types and successional stages. Fishers are closely associated with forested riparian areas they use for foraging, resting, and travel. Although fishers use a variety of successional stages, most investigators have identified a preference for mature-old-growth forests. Avoidance of openings may be somewhat dependent on season and available cover. Clearings may be used if continuous shrub cover is available. Most studies suggest that fishers are tolerant of moderate levels of human activity, but populations may be indirectly affected by removal or fragmentation of habitat and increased trapping accessibility.

In a study conducted on the Nez Perce National Forest in the Elk City area, most fisher observations were in mesic grand fir habitat types (Jones, 1991). Grand fir and Engelmann spruce dominated stands the fishers used in summer. Similarly, in winter fishers used grand fir, Engelmann spruce, and lodgepole pine dominated stands. Summer habitat had a relatively high component of moderate to large diameter Engelmann spruce, large diameter Douglas-fir, and pacific yew. Fishers avoided stands with a strong lodgepole or ponderosa pine component. Winter habitat included stands with a relatively high basal area in Douglas-fir and lodgepole pine.

The study area had only a small representation of western red cedar habitats that occur extensively in the lower Selway and Middle Fork subbasins. In the Cabinet Mountains of northwestern Montana, where cedar habitats are more strongly represented, fishers preferred cedar-hemlock and mixed conifer stands (Roy, 1991 and Heinemeyer, 1993).

The physical structure of the forest and the prey associated with forest structures may be the critical features that explain fisher habitat use rather than specific forest types. Structure includes vertical and horizontal complexity created by a diversity of tree sizes and shapes, light gaps, dead and down wood, and layers of overhead cover (Powell et al. in Ruggiero, 1994).

In the Montana study area, fishers also showed preference for low-elevation, low-gradient, north-facing areas near water. Areas greater than ¾ mile from water were avoided. Fishers also avoided high elevations from 3,900 to 5,200 feet and areas of heavy and frequent snowfall; they

selected lower elevations from 2,000 to 3,300 feet. Fishers selected areas near perennial streams, rivers, marshes, and lakes. Sixty-five percent of fisher locations were within 656 feet of water, and fishers selected areas greater than ¼ mile from perennial streams.

In Elk City, Idaho, home ranges contained 53 percent mature-old-growth stands on average. In summer, 90 percent of observations were in mature-old growth forest. In winter, 54 percent were in mature-old-growth and 46 percent in young forest (Jones and Garton, 1994). Mature-old growth stands were used extensively for resting, while hunting occurred in a range of successional stages. For resting, fishers preferred stands with canopy cover greater than 60 percent and for hunting they preferred canopy cover greater than 80 percent.

In Idaho, fishers strongly selected wetland forest types, with selection for forested riparian habitats evident at several scales in summer and winter (Jones, 1991). In summer, 50 percent and 75 percent of observations were within 49 and 75 feet of water. Moving across landscapes, fishers commonly used forested riparian areas, where preferred resting habitat and prey may be more available than in surrounding habitats.

Potential fisher habitat is abundant in the subbasins in mesic upland old growth and along low elevation riparian areas associated with old and late forest.

The Elk City study found fisher home ranges to be between 2.3 to 46 square miles. Generally, ranges of adults of the same sex do not overlap. In a Maine study, males moved extensively in late winter and early spring and their ranges shifted between years, while home ranges of females were stable between seasons and years.

Fishers are active both day and night. They are primarily nocturnal in summer and diurnal in winter. When inactive, fishers occupy dens in tree hollows, under logs, in the ground or rocky crevices, and in warmer months, they rest in branches of conifer trees.

In the Elk City study, ungulate carrion, mice and voles, snowshoe hare, plant material, and beaver, in order of significance, were the most common food items in fisher diets.

Most of the known natal and maternal den sites have been discovered in eastern North America. The vast majority of these were located high in living or dead trees. All natal and maternal dens in the west were found in large diameter logs or snags (Powell et al. in Ruggiero, 1994).

Departures from Historic Conditions and Current Threats

Timber harvest and wood cutting activities may remove fisher resting and denning sites in live trees, snags, and downed logs. Logging during denning periods could cause direct mortality if dens are destroyed. Although fragmentation of late successional forests is detrimental to fisher conservation, fisher did evolve with forest openings resulting from fire and windthrow. Fisher habitat is diminished when timber harvest removes overstory canopy from areas larger and more extensive than fire and windthrow would (Powell et al. in Ruggiero, 1994).

Potential fisher habitat in the Middle Fork Clearwater, Clear Creek, and O'Hara and Goddard ERUs has been fragmented by timber harvest. Currently, old growth is under-represented and mid-seral structure foraging habitat is more extensive compared to historic conditions as a result of timber harvest and fire exclusion.

High road densities may increase fishers' vulnerability to trapping. Although fishers are legally protected in the state of Idaho, they are easily trapped in bobcat, fox, and coyote traps. Trapping mortality is disproportionately higher for males than for females and inadequate numbers of males negatively influence reproductive rates. Low reproductive rates and low-density populations will recover slowly and make small or isolated populations vulnerable to extirpation.

Roads that intercept fishers traveling from upland habitat to riparian areas can be detrimental. Fishers have been observed to abort their Highway 12 crossing attempts to reach the river when vehicles approach. Forest roads that may present barriers to movement to and from riparian habitat are located in the Deep Creek, Upper Selway Canyon, and Clear Creek ERUs.

Fire exclusion detrimentally influences the maintenance of the mosaic of forest habitat that fishers depend on.

NORTHERN GOSHAWK *(Accipiter gentilis)*

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species and management indicator species in the Nez Perce National Forest (USFS); State of Idaho, species of special concern.

The Northern goshawk, federally designated as a candidate species by the U. S. Fish and Wildlife Service, is currently under consideration for listing as threatened or endangered. It is classified as a sensitive species in the Forest Service Northern Region and as a protected species of special concern in the state of Idaho.

Goshawks breed from western and central Alaska, east to northeastern Manitoba, Labrador, and Newfoundland, and south to central California, southeastern Arizona, the eastern foothills of the Rocky Mountains, southern Manitoba, New England, and the Appalachians. Goshawks breed locally in Mexico and winter throughout the breeding range and irregularly south to northern Mexico. Locally, some goshawks from high elevations in montane areas descend to lower elevations into woodlands, riparian areas, and shrublands during winter (Patla et al., 1995).

The casual observer does not often encounter the goshawk, as it occurs at fairly low densities in areas remote from human habitation. Eleven sightings within the subbasins were reported between 1992 and 1998. Two separate sightings were reported in the Upper Selway Canyon ERU at Gardiner Lookout in 1992 and 1993. Two occupied nest observations occurred in the Meadow Creek ERU in 1992. In 1993, a goshawk was reported in the North Selway Face ERU. A goshawk sighting was reported in the Clear Creek ERU in 1993. Two reports of an occupied goshawk nest sighting occurred in the Middle Fork ERU in 1992. These two observations could have been the same nest. Two additional goshawk sightings were reported in the Middle Fork ERU in 1992. Another goshawk sighting in the Middle Fork ERU occurred in 1997. This observation may have been associated with the earlier reports due to proximity of the earlier sightings.

Ecology

General Habitat: Northern goshawks are most commonly found in dense, mature and old-growth stands (Reynolds et al. 1982, Crocker-Bedford and Chaney 1986, McCarthy et al. 1987, Hayward and Escano 1989, Whitford 1991). In northwestern Montana, northern goshawks typically nested in mature and overmature forest with a closed canopy of 75 to 85 percent on moderate slopes of 15 to 35 percent with northerly aspects (Hayward and Escano 1989). Nest sites were often located on lower slope positions, and in one of the older stands in an area. Both water and a large opening were usually within 1/3 mile of nests. The location of mature forest stands near natural openings and riparian areas may be important for foraging goshawks to utilize habitat with high prey densities (Hargis et al., 1994 in Patla et al., 1995).

Potential goshawk habitat in mesic forest is abundant in the subbasins. However, current mesic, old structure in the Middle Fork Clearwater, Clear Creek, and O'Hara and Goddard ERUs has been fragmented by timber harvest. Currently, old growth is under-represented and mid-seral structure foraging habitat is more extensive compared to historic conditions as a result of timber harvest and fire exclusion. A large patch of potential contiguous goshawk habitat occurs on the north face of the Middle Fork Clearwater River in Bridge Creek. In other wilderness ERUs, including Pettibone and Bear, Running and Goat, Moose Creek, Marten, Otter and Mink, Gedney and Three Links, and roadless Meadow Creek, potential goshawk habitat is plentiful in large, contiguous patches.

Use of stands for nesting in the upper Columbia River basin appears to be associated with the structural characteristics of stands rather than particular species composition. The majority of

nesting territories in the upper Columbia River basin were found at elevations ranging from 4,000 to 8,000 feet (Patla et al., 1995).

Home Range: Little information is available on goshawk home range size and composition, but the few existing studies indicate goshawks range over large areas, from 1,988 to 9,638 acres, and use a variety of habitats outside the nesting area.

Nesting Habitat: Goshawk territories typically contain a number of alternate nests, from two to nine, that may be clumped in adjacent stands or in widely scattered stands. Goshawks have been found to use the same nesting areas for decades, but often change nest locations in consecutive years. Goshawks may use alternate nest sites as a mechanism to avoid consistent predation by avian and mammalian predators. In northern California, stand clusters less than 49 acres had occupancy rates less than 20 percent, while stand clusters greater than 151 acres had occupancy rates of nearly 100 percent (Patla et al., 1995).

In Glacier National Park, a goshawk nest was located in the spruce-fir zone at 4,500 feet (Parratt, 1959). Whitford (1991) examined 12 nests in the Lewis and Clark National Forest in Montana. All nests were on north aspects and mean canopy closure was 72 percent. Mean live tree diameter was 29 inches and mean live tree age was approximately 200 years.

In northeastern Oregon, Reynolds et al. (1982) studied goshawk habitat. Goshawks there were found to nest on gentle slopes with northwest to northeast aspects in dense, mature conifer stands. Goshawks located a majority of nests in old-growth stands, and used mixed conifer, fir, and pine cover types. Canopy closure averaged 60 percent. About two-thirds of the nests were less than 1/3 mile from water, but based on the locations of the remaining nests, water does not appear to be a requirement. In general, shaded, mild environments and protected sites were used. Moore and Henny (1983) also examined goshawk nest sites in northeastern Oregon. Stands of larger conifers with a mean diameter of 21 inches and with relatively low understory crown volume were used. Douglas-fir and western larch were preferred nest trees, and a majority of nests were located on north or flat aspects.

In northern Arizona, Crocker-Bedford and Chaney (1986) found that dense stands provided better goshawk habitat. Good nest stands had at least 79 percent canopy cover, while marginal stands had at least 60 percent canopy cover. The vast majority of the canopy came from trees greater than 10 inches diameter, and nest stands had much higher densities of large trees than typical stands within the study area. Ponderosa pine stands were more likely to be on north aspects than mixed conifer stands. Crocker-Bedford and Chaney (1986) speculated that dense canopies in mixed conifer stands might be enough to provide a cool microclimate.

Departures from Historic Conditions and Current Threats

Removal of nest trees or reduction in stem density and canopy volume through timber harvest threatens goshawk's nesting habitat. Structure, age, and patch size of the remaining forest habitat may be factors in determining whether goshawks continue to use modified nesting territories over time. Reduction of tree density and canopy cover along streams in forest habitat can destroy nesting areas and reduce or eliminate foraging potential. Timber harvest may reduce habitat for goshawk prey and influence numbers of breeding goshawks and their productivity. Timber harvest and firewood cutting can remove dead, dying, deformed, and diseased trees that are important to goshawk nesting and prey habitat.

Habitat fragmentation may influence migration corridors and dispersal movements of goshawks. Insufficient information about important wintering habitats is available to understand potential impacts.

Opening the structure in nesting habitat may increase predation of goshawks and especially their nestlings by great-horned owls. The creation of more open habitat may lead to replacement of nesting goshawks by red-tailed hawks and great horned owls. Great gray owls also use goshawk's alternate nests.

Fire exclusion can result in vegetation structural changes that lead to reductions in goshawk nesting habitat, prey numbers, and foraging opportunities. Agency ignited fire in spring may impact nesting goshawks. Livestock grazing may alter the structure and composition of cover on the forest floor and in openings resulting in alteration of goshawk prey species' habitat.

Most states issue about 10 to 12 permits a year to falconers for takes at the nest. State wildlife agencies in the west indicated in a survey that use is minimal and is not adversely affecting goshawk numbers. Agency personnel are concerned about lack of data for illegal takes, although they do not view it as a significant problem.

GREAT GRAY OWL (*Strix nebulosa*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service); State of Idaho, species of special concern.

The great gray owl primarily occurs in dense, northern boreal forests but also finds suitable coniferous habitat south into the northern Rocky and Sierra Mountains and along some central Asiatic mountain chains.

Observations of great gray owls in the subbasins are rare. A researcher living at Running Creek Ranch in the upper Selway canyon between 1988 and 1995 reported resident great gray owls were rarely seen, even in typical habitat, within 25 miles of the ranch, the area surveyed during his stay. In the Middle Fork Clearwater River ERU, a resident reports that a great gray owl population lives on his land and he commonly observes individuals.

Ecology

Great gray owls are associated with mesic, old tree environments. Potential great gray owl habitat in mesic forest types is abundant in the subbasins. However, current mesic, old structure in the Middle Fork Clearwater River, Clear Creek, and O'Hara and Goddard ERUs has been fragmented by timber harvest. Currently, old growth is under-represented and mid-seral structure foraging habitat is more extensive compared to historic conditions as a result of timber harvest and fire exclusion. A large patch of potential contiguous habitat occurs on the north side of the Middle Fork Clearwater River in Bridge Creek. In other wilderness ERUs, including Pettibone and Bear, Running and Goat, Moose Creek, Marten, Otter and Mink, Gedney and Three Links, and roadless Meadow Creek, potential habitat is plentiful in large, contiguous patches.

Few studies addressing the ecology of the great gray owl in the west are available. The study that was conducted in habitats that most closely approximate subbasin environments occurred in northeastern Oregon on the Wallowa Whitman National Forest (Bull and Henjum, 1990). Forests within the study area were entirely coniferous and contained ponderosa pine, Douglas-fir, grand fir, western larch, and lodgepole pine.

Nesting: Great gray owls regularly nested in close proximity to other great gray owls. Great gray owls do not construct their own nests and rely on existing platforms built by goshawks and occasionally red-tailed hawks. Great gray owls also frequently used natural platforms formed by dwarf mistletoe brooms. Fifty-one percent of the nests were stick platforms made by other hawks, 29 percent were artificially constructed wooden platforms, and 20 percent were natural depressions on broken-topped dead trees.

Most stick nests were in large diameter western larch and most nests on broken-topped trees were in large diameter ponderosa pine. Nests monitored in the study were often used more than once. Fifty percent of the nests were found in Douglas-fir-grand fir forest types, 29 percent in lodgepole pine-western larch, 15 percent in ponderosa pine-Douglas-fir, and 7 percent in ponderosa pine. Seventy-four percent of the nests occurred in stands with trees greater than 19.3 inches diameter, 26 percent occurred in stands with trees 11.8 to 19.3 inches diameter, and none occurred in stands of trees less than 11.8 inches diameter.

Sixty to 80 percent of the stands in each study area had been logged but seventy-two percent of the nests were in unlogged stands. Nineteen percent of the nests were in stands with partial removal of the overstory, and 9 percent were within 656 feet of a clearcut. Forty-seven of the 49 nest sites had two or more canopy layers with a canopy closure exceeding 60 percent at most nest sites. Sixty-nine percent of the nests occurred on gentle slopes, 22 percent on flat ground, and 9 percent in draws. Most nests occurred on north slopes.

Broken-topped dead trees, dead branches in large diameter trees, and leaning trees with bark are preferred perch sites near the nest for females and juveniles that leave the nest to defecate and regurgitate pellets.

Forage: The diet of great gray owls primarily consists of small mammals. Foraging habitat is usually characterized by forested stands with an open understory where owls can fly more freely in search of prey. Most of the male owls observed preferred to forage in stands with 11 to 59 percent canopy closure and avoided stands with at least 60 percent canopy closure. Edge habitat was also used, dependent on prey availability. The owls hunted from perches averaging 18 feet above the ground. Prey capture sites were primarily grass dominated. Downed wood was within about 3 feet of the point of capture at most of the sites, presumably providing cover for small mammal prey.

Range: The maximum distance adults traveled from nest sites averaged 8.3 miles and home range size averaged 26 square miles. Distance traveled in winter appears to be related to snow depth. Great gray owls plunge for their prey under snow and are more successful foraging in shallower snow depths. An adult female and a juvenile owl, in different winters, followed logging operations as they moved to different stands. Tree falling and soil disturbance may have displaced many small mammals and made them easy prey.

Departures from Historic Conditions and Current Threats

Timber harvest and firewood cutting have the greatest potential impacts to great gray owl populations. Timber removal and fire wood cutting typically reduce live, diseased, and dead large-diameter trees used for nesting, leaning trees used by juveniles for roosting before they can fly, and dense canopy closures in stands used by juveniles for cover and protection. Structure, age, and patch size of remaining forest habitat may be factors in determining whether great gray owls continue to use modified nesting territories over time. Habitat fragmentation may influence migration and dispersal movements of great gray owls. If perching structures and vegetative and dead wood cover are eliminated in clearcuts, they are rendered unsuitable for foraging.

Opening nesting habitat structure may increase predation on great gray owl eggs and nestlings by ravens and by other raptors. Ravens have been observed monitoring nests and eating eggs of great gray owls.

Livestock grazing may alter the structure and composition of cover on the forest floor and in openings resulting in alteration of great gray owl prey species' habitat.

Fire exclusion can result in vegetation structural changes that lead to reductions in great gray owl nesting habitat, prey numbers, and foraging opportunities. Agency ignited fire in spring may impact nesting great gray owls.

Pocket gophers comprise about a third of the great gray owl diet. Strychnine poisoning of gophers may be potentially harmful to great gray owls, either directly from secondary poisoning or indirectly from loss of prey.

BROWN CREEPER *(Certhia americana)*

Status

Status Designation: Federal, not listed; State of Idaho, protected nongame species.

The brown creeper is primarily found in the western portion of the Forest Service Northern Region in northern Idaho and western, and northwestern Montana. It has no special designation by the Forest Service Northern Region or the Nez Perce National Forest.

Brown creepers breed across portions of Alaska and Canada, south to southern California, the mountains of middle America, west Texas, and portions of the midwestern and eastern United States. It winters throughout the breeding range, except for higher latitudes and elevations, south to Gulf Coast.

The brown creeper was selected as a representative species for mesic habitats in the subbasins because it is strongly associated with old cedar forests that are fairly abundant in the subbasins. Few other species are known to be as strongly associated with the old cedar forest type.

A researcher living at Running Creek Ranch in the upper Selway canyon between 1988 and 1995 reported resident brown creepers were common in typical habitat within 25 miles of the ranch, the area he surveyed during his stay. The only documentation of brown creepers in the subbasins outside wilderness occurred in the Meadow Creek ERU during a landbird monitoring survey in June 1996. Two brown creepers were recorded. Transects in O'Hara and Goddard and Lower Selway Canyon ERUs were also surveyed with no recorded occurrences of brown creepers.

Ecology

The brown creeper is found in forests, woodlands, and swamps. During winter and in migration, it is also found in scrub and parks. Preliminary results of a northern Idaho study indicated the brown creeper was more abundant in continuous old growth than in fragmented or selectively harvested stands.

The brown creeper eats primarily insects and other invertebrates and some nuts and seeds. It forages on the bark of tree trunks and branches. Brown creepers usually nest under bark in trees and sometimes also will nest in cavities. When pursued, the brown creeper spreads its wings and remains motionless on the trunk of a tree (Hejl, S.J. and L.C. Paige, 1993).

Clutch size varies from four to eight eggs, but is commonly five to six eggs. Incubation lasts 14 to 15 days and both parents tend the young that leave the nest at 13 to16 days.

The brown creeper is strongly associated with old cedar-hemlock forests. They have also been detected in lodgepole pine, spruce-fir, mixed conifer, ponderosa pine, and to a minor extent, in Douglas-fir cover types (Hutto, 1995).

Departures from Historic Conditions and Current Threats

Very little information addressing the ecology of the brown creeper was found for this evaluation. Most of the information presented here regarding threats and conservation measures is speculative and based on needs of other species in similar habitats.

Timber harvest probably has the greatest potential impact on brown creeper populations. Timber removal typically reduces dense canopy closures and live, diseased, and dead large-diameter trees used for nesting and foraging. Structure, age, and patch size of the remaining forest habitat may be factors in determining whether brown creepers continue to use modified habitats over time. Fragmentation of contiguous old growth is potentially deleterious to brown creeper populations that are found to occur more frequently in contiguous old growth.

Fire exclusion can result in vegetation structural changes that lead to reductions in brown creeper habitat. Agency ignited fire in spring may impact nesting brown creepers.

BLACK-BACKED WOODPECKER *(Picoides arcticus)*

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species in Northern Region, USFS; State of Idaho, species of special concern and protected nongame species.

The black-backed woodpecker is a resident from western and central Alaska to northern Saskatchewan and central Labrador, and south to southeastern British Columbia, central California, northwestern Wyoming, portions of Great Plains states and Prairie Provinces, and northern New England. This species wanders irregularly south in winter. Black-backed woodpeckers have been documented in the subbasins in the upper Selway in recently burned habitats.

Ecology

The black-backed woodpecker is found in primarily spruce-fir coniferous forests, especially in windfalls and burned areas with standing dead trees. It is found less frequently in mixed forests, and rarely in deciduous woodlands in winter.

Black-backed woodpeckers primarily forage on wood-boring insects, but will also eat spiders, fruits, nuts, and some cambium.

Black-backed woodpeckers excavate new cavities in decaying trees or standing snags each year. Populations can be irruptive in recent burns. Few nests have been located in Idaho. In Oregon, home range size varied from 173 to 845 acres, and there was no intraspecific overlap.

Preferred Montana nest sites and foraging areas are in recently burned areas; use declines within 3 years post-burn (Harris, 1982). In central Oregon, the black-backed woodpeckers used beetle-infested, mature and old-growth mixed forests and lodgepole pine and they avoided logged and young stands (Goggans et al., 1989). Nest tree diameters averaged 9 inches, most in larch in Montana (Harris 1982) and 8.3 inches in a variety of species in Oregon (Bull et al., 1986). Most nests were in trees dead less than 5 years (Bull et al., 1986). Nests were located in dense stands, averaging 117 trees for every 2.5 acres (Harris 1982). In western Montana, larch was a preferred foraging species (Harris 1982). In Oregon, roost sites were in lodgepole pine, in cankers, scars, mistletoe clumps, or directly on the trunk (Goggans et al., 1989).

Departures from Historic Conditions and Current Threats

Threats to black-backed woodpeckers in the subbasins include fire exclusion, salvage of dead trees, and firewood cutting. Historic status of black-backed woodpecker populations in the subbasins is unknown. However, historic habitat has been diminished.

BALD EAGLE *(Haliaeetus leucocephalus)*

Status

Status Designation: Federal, threatened species (U. S. Fish and Wildlife Service) and management indicator species Forest Service Northern Region (USFS); State of Idaho, species of special concern.

The bald eagle breeds from central Alaska, east to northern Saskatchewan, Labrador, and Newfoundland, and south, locally, to northern Mexico, New Mexico, Arizona, Texas Gulf Coast, and Florida. It is a very local breeder in interior North America. Bald eagles generally winter throughout the breeding range except in the far north. They primarily occur near seacoasts, rivers, reservoirs and lakes.

Bald eagles were federally classified as endangered in 1973, but were reclassified to threatened in 1995. The Nez Perce National Forest has designated the bald eagle as a management indicator species. The subbasins are within Bald Eagle Recovery Zone 15, designated by USFWS, which encompasses all of central Idaho. Recovery goals for Zone 15 are to provide

secure habitat for at least six bald eagle nesting territories, with long-term occupation of at least four breeding pairs. This goal has been exceeded every year since 1990. From 1979 to 1995, Idaho's nesting bald eagle population increased from 11 to 77 occupied territories. In 1995, 51 pairs from occupied territories successfully fledged an average of 1.2 young per pair.

An annual survey for wintering bald eagles is conducted along the lower Selway River and the Middle Fork Clearwater River in conjunction with the Idaho midwinter bald eagle count and wintering populations appear to be stable.

Ecology

No existing or historic bald eagle nesting activity has been documented in the subbasins, but a nest was discovered within the last two years in the North Fork of the adjacent Clearwater River. Bald eagles are winter residents on the Selway River and the adjacent Middle Fork Clearwater River from October through April. Peak numbers occur between November and February. Bald eagles typically move from the Selway River to the open reaches of the Middle Fork Clearwater River from December to March. The relocation is most likely due to the availability of prey or carrion. Wintering bald eagles also occur in the upper Selway and their movement patterns are unknown. Selection of wintering habitat by bald eagles is determined by availability of prey and carrion, potential for human disturbance, and availability of suitable perching and roosting sites.

Nesting: Bald eagles build stick nests in forks of tall trees, or occasionally on cliffs. In winter, adults often roost communally at night in trees used in successive years. In winter in some areas, adults preferentially roost in conifers, or other sheltered sites, and may associate with waterfowl concentrations, or congregate in areas with abundant dead fish or ungulate carrion.

In selecting nesting habitat, bald eagles usually prefer late-successional forests in close proximity to water and with relative isolation from human disturbance (MBEWG, 1991). In northwestern Montana, all nest sites were within one mile of a lake or reservoir larger than 39.5 acres or a stream greater than fourth order in size (Wright and Escano, 1986), denoting the importance of proximity to an adequate prey base.

Nesting stands and nest trees are selected based on structure. Multi-layered mature to old-growth forests are strongly preferred. Often, more than one nest site is available within selected stands. Nest trees are typically mature or overmature with open crowns and sturdy limbs, and occupy dominant positions within stands. Ponderosa pine, Douglas-fir, and cottonwood trees are most frequently selected in western Montana, probably because their typical growth forms are able to support large nests (MBEWG, 1991). Nest position in relation to associated water bodies is an important factor. In western Montana, all nests were within topographic line-of-sight of water; all were less than 450 feet in elevation above the associated water body; in 90 percent of cases, nests were less than .38 miles in distance from the associated water body (R1 protocols).

Forage: Rivers and open upland areas provide foraging habitat for bald eagles in the subbasins. Perch sites are an important attribute of foraging habitat (Fielder and Starkey, 1986). Proximity to potential prey, isolation from disturbance, good visibility of the surrounding landscape, and accessibility for landing and departure are critical components of preferred perches (Stalmaster, 1987).

Prominent, large trees in close proximity to winter foraging areas characterize perch sites. Roost sites often are wind-sheltered, dominant trees in the Selway River canyon bottom. Bald eagles inhabit areas adjacent to and within close proximity to water sources providing an abundance of prey species, such as waterfowl, anadromous fish, and ungulates on winter ranges, which provide a source of carrion.

Home Range: Home ranges of bald eagles nesting along Cascade Reservoir in west-central Idaho have ranged from 6 to 23 square miles during breeding season, and ranges have typically been half that size at other times.

Departures from Historic Conditions and Current Threats

Bald eagle habitat quality in the subbasins has likely declined in the last century. Before 1911, bald eagles wintering along the Selway River fed on chinook salmon as well as ungulate carrion. Availability of ungulate carrion peaked in the late 1950s, as local elk herds increased (Leege, 1984). In more recent decades, ungulate carrion has likely declined, along with elk and deer numbers, due to increased access, more lenient hunting seasons, increased hunter pressures, and fire suppression resulting in prolonging late successional plant communities (Leege, 1984).

Removal of campground hazard trees and snags along the river's edge can impact bald eagles by reducing preferred available perch sites. Activities such as timber harvest, fire suppression, grazing, and public uses that may impact the productivity or availability of winter ranges by native ungulates, also may indirectly impact bald eagles by reducing carrion food sources. Application of rodent control pesticides can potentially lead to inadvertent poisoning of eagles that prey on rodents.

Reduced habitat security and increased human induced disturbance and mortality risks related to logging activities during winter seasons have also impacted eagles and their habitats. Degradation of aquatic ecosystems affecting fish prey also contribute to bald eagle impacts.

Forest Service authorized helicopter flights, blasting, and other loud noise associated with trail maintenance, within the Selway River canyon during eagle occupancy, can displace or disrupt the feeding, roosting or perching of wintering eagles.

Human disturbance can impact bald eagles during both the nesting and wintering seasons. Eagles may react to people walking, bicycling, driving vehicles or snowmobiles, boaters stopping near nests or passing near feeding sites, use of explosives, shooting, tree harvesting operations, or operation of loud equipment. These activities can disrupt breeding and feeding activities, force eagles to desert a nesting territory, or displace eagles to less desirable habitats. The effects depend on the timing, intensity, and frequency of the disturbance, and the sensitivity of the individual eagles.

Wintering bald eagles may be unduly stressed by human activities if their feeding or normal social behavior is disrupted. Eagles on the ground, whether feeding or standing, are more sensitive to disturbances, and eagles will fly greater distances when flushed from river bars or banks than when flushed from trees.

Generally, eagles are most sensitive to disturbances coming from water rather than land, and disturbances in the open rather than those screened by vegetation. According to the Montana Bald Eagle Working Group, some birds become habituated to human activities while others never do (Paige, 1991). Highway 12, Selway River Road, and Paradise Road are adjacent to rivers where bald eagles winter. Some eagles appear to be habituated to traffic, but significance of potential changes in heart rate and other influences are unknown.

HARLEQUIN DUCK (*Histrionicus histrionicus*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species Forest Service Northern, Rocky Mountain, and Pacific Regions (USFS) and the Bureau of Land Management in Idaho and Montana; State of Idaho, species of special concern.

The harlequin duck is designated a species of special concern in Idaho, Montana, and Wyoming. The Northern, Rocky Mountain, and Pacific Regions of the U. S. Forest Service, the Bureau of Land Management in Idaho and Montana, and the state of Oregon classify it as a sensitive species. In Washington, it is designated a priority habitat species. Harlequin ducks are also classified as migratory waterfowl and managed under general waterfowl or sea duck regulations by USFWS (Cassirer et al., 1997).

Harlequin ducks winter in coastal areas and migrate inland to breed along mountain streams. It is the only duck in the northern hemisphere to breed almost exclusively along swiftly flowing mountain streams. Harlequins that breed in the subbasins are within the northern Columbia River basin subprovince of the Pacific population, which includes Idaho north of the Salmon River and northwestern Montana. Harlequins in the Pacific population primarily winter in coastal areas of Alaska, British Columbia, Washington, Oregon, and northern California.

The entire Idaho population is less than 100 birds on about 30 streams in northern Idaho. Eighty-nine percent of known and probable breeding occurrences and 93 percent of known and probable breeding streams in Idaho are on lands managed by the Forest Service.

The draft *Harlequin Duck Habitat Assessment and Conservation Strategy*, (Cassirer et al., 1996) prepared for the Forest Service and the Bureau of Land Management lists the Selway River as a known harlequin duck breeding stream and Bear Creek as a stream with documented sightings but with unknown breeding status. Moose Creek, White Cap Creek, and Meadow Creek are subbasin streams listed as being potential harlequin duck breeding streams because of suitable habitat. In 1989, harlequins on the Selway River and a pair in Bear Creek were reported. Harlequins also occur in the adjacent Lochsa River, a tributary of the Middle Fork Clearwater River, and in the South Fork of the Clearwater River.

Ecology

Harlequin ducks migrate from the coast to breeding areas in Idaho in March, April, and May and return to the coast from June through September. Some Idaho birds migrate to the San Juan Islands in Washington in winter. Migration routes are thought to follow stream corridors. Harlequins have been observed in the subbasins on the Selway River en route to spring breeding sites.

Harlequin ducks in Idaho are strongly associated with swiftly flowing water, and streams with a cobble to boulder substrate that are structurally controlled by bank morphology, specifically reticulate canyons. Stream channels range from braided to straight with an abundance of riffle and rapid habitats in second to fifth order streams. Some use of mountain lakes and lake outlets has been documented in the Canadian Rocky Mountains. Forest overstory is old growth to mature western red cedar, western hemlock or Engelmann spruce-subalpine fir. Most sites have rocks or logs in the stream that can be used by harlequins for loafing sites. Woody debris is often present in the stream. In Idaho, harlequins have been observed at elevations between 2,000 and 4,000 feet. Most sites used by harlequins are over 164 feet from roads with no maintained access or are accessible only by trail or boat.

Nesting and Rearing: Harlequins do not breed until their second year. They maintain a multi year pair bond and pairs exhibit a strong fidelity to breeding streams. Egg laying and incubation generally occur between mid May and the third week in July. Drakes return to the coast when incubation is initiated. Hatching begins in mid June and some broods fledge by the end of August while others remain unable to fly until the end of September. In one study, up to 40 percent of hens abandoned their broods before fledging. Hens return to the coast in August or September and ducklings return in the summer and fall after fledging.

Harlequin duck nests are well hidden, usually located on the ground on islands, stream banks in shrubby vegetation, in cliff cavities, and in tree cavities. Clutch size averages 5.7 eggs. Survival rates to fledging range from 18 to 83 percent. Duckling mortality is associated with high water flows, mammalian and avian predation, and possibly adverse weather and human disturbance.

Brood rearing habitat is in part characterized by vegetative overhang and more instream woody debris. Both of these components, as well as undercut stream banks provide hiding cover and protection from predators. Streams with higher pair densities were smaller, had more woody debris, vegetative overhang and bank undercut, and tended to have more areas with slower flow. Streams with higher pair density also were less accessible by people and had a higher percentage of old growth as opposed to mature overstory.

Forage: Harlequin ducks primarily feed on benthic macroinvertebrates and the distribution of this food source probably is closely associated with harlequin breeding and brood rearing habitat. Stream insect larvae are the primary food on breeding streams, although harlequins will also feed on roe when available.

Departures from Historic Conditions and Current Threats

Stream bank and channel alteration may reduce the quality of harlequin duck habitat by eliminating or reducing food supply. Activities that should be assessed for impacts to riparian habitats include stream channelization, damming, livestock grazing, shrub removal, timber harvest, gravel extraction, logjam removal, dredging, bank rip-rapping, and road construction.

Sedimentation in stream habitat resulting from timber harvest, road and trail construction, livestock grazing, and mining may reduce the density of harlequin macroinvertebrate food supply and reduce the harlequin's ability to find prey. Dewatering feeding and brood rearing areas during the breeding period will render them unavailable to harlequin ducks with potential impacts to productivity.

Harlequin ducks can be displaced by instream river use, particularly on narrow streams. Instream recreational activities like boating and angling may be more disruptive when occurring during the pre-nesting and early brood rearing season from May through July, than when occurring later in the breeding cycle from August through September. Large-scale rafting operations in the breeding period may cause chronic disturbance in heavily used river stretches.

Human activities along the banks, including hiking, angling, and camping, may also displace ducks and indirectly impact reproduction. Adult harlequins are relatively tolerant of low levels of disturbance. Areas chronically disturbed are eventually abandoned. Harlequins sometimes flush in response to approaching boats, depending on the size of the craft, width of the stream, and water levels. All streams in the subbasins where harlequin ducks have been observed and where potential habitat is thought to exist are in wilderness. Potential threats there are primarily related to blasting, boating, angling, campsites, and pack stock grazing. Boaters use the Selway River in great numbers beginning in April and throughout harlequin breeding and brooding periods.

Meadow Creek, designated roadless, is thought to have potential habitat for harlequins: associated threats may include motorized vehicle use on trails and timber harvest. Boating also occurs in Meadow Creek in the spring in high water during harlequin breeding and brooding periods. Boating in the relatively small stream channel would pose a greater threat to harlequin ducks than in larger, less confined streams.

Agency prescribed spring burning in Meadow Creek may disrupt potential breeding harlequins in breeding streams.

Other potential threats to harlequin ducks are associated with their coastal wintering habitat and include logging, marine oil spills, shoreline development, aquaculture, algae harvesting, and hunting.

COEUR D'ALENE SALAMANDER *(Plethedon idahoensi)*

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species Forest Service Northern Regions (USFS) and Bureau of Land Management in Idaho (BLM); State of Idaho, species of special concern.

The Coeur d' Alene salamander is designated a sensitive species by the Forest Service Northern Region and the Bureau of Land Management in Idaho. It is designated a state species of special concern in Idaho and Montana because it is a regional endemic, known only from northern Idaho, northwestern Montana, and southern British Columbia, and because of its specific habitat association with seeps, streams, and waterfalls.

The Coeur d' Alene salamander is one of only four salamander species known to occur in Idaho and Montana, and is the only lungless salamander known from the northern Rocky Mountains. Eighty-five percent of the sites of occurrence for Coeur d' Alene salamanders in the U. S. have been documented in northern Idaho. The Selway River drainage bounds the southern limit of its known range in Idaho.

Fourteen Coeur d' Alene salamander sites are documented along the lower Selway River. Most of these were discovered during surveys between 1986 and 1990. Two were found within the last three years. Few of the earlier recorded sites have since been monitored. Other potential habitat occurs within the subbasins and includes the Moose Creek and Pettibone and Bear Creek ERUs.

Ecology

Coeur d'Alene salamanders, like all plethodontid salamanders, are lungless and respire through their moist skin. They lose water to the environment through evaporation and are therefore restricted to cool, damp environments. They spend most of their life underground and are usually only above ground at night during moist weather in the spring and fall, and sometimes in summer with favorable moisture conditions. They may spend up to 7 months of the year underground in cool, moist interstitial spaces between rocks to avoid desiccation in summer and freezing in winter.

Coeur d' Alene salamanders have been found in three major types of habitats: springs or seeps, waterfall spray zones, and edges of streams. Most known locations are associated with seeps, probably because of the relative ease of surveying roadside seeps. Streams and waterfalls are often less accessible, especially at night when surveys are conducted.

Coeur d' Alene salamander sites usually are associated with coniferous forest but are not restricted to a specific overstory species or aspect. They have been found in areas with overstories of ponderosa pine, Douglas-fir, western larch, western red cedar, and western hemlock at all aspects. Forest cover may be more important at stream sites than at seep sites as average canopy cover at known stream sites was significantly greater than at seep locations. Average slope at sites was steep at 62 percent with elevations between 1,600 and 5,000 feet.

A Coeur d' Alene salamander population discovered along the lower Selway River in 1998 was on a steep, south facing, rocky slope devoid of tree cover but was associated with seeps. Many of the individuals were found under fallen rock at the bottom of the slope in the road ditch where water had accumulated.

Known populations occur with sharply fractured rock formations used for underground refugia and in conjunction with both persistent and intermittent surface water. Suitable habitat may occur in rocky areas far from free water and it is possible to locate salamanders at a wet site in the spring, yet be unable to find any individuals at the same site later in the summer when the site is dry on the surface.

Departures from Historic Conditions and Current Threats

Coeur d' Alene salamanders exist as small, isolated populations with low reproductive rates that are vulnerable to extinction from catastrophic events like fire and floods, and from loss of genetic diversity that could restrict the species' ability to respond to changing environmental conditions. These factors may have significant implications for long-term viability of the species.

There is rising global concern about declining amphibian populations. Amphibians are sensitive bioindicators of environmental change because of their highly permeable skin, trophic positions, and occurrence in fragmented but interconnected populations. The status of salamander populations is one indicator of the overall health of an ecosystem.

Logging, prescribed burns, or road and trail construction near salamander sites in fall and early spring may disturb aboveground breeding activities. Blasting and rock quarrying or removal associated with road, trail, and campsite construction projects could directly kill salamanders and potentially eliminate subterranean habitat. Application of road dust abatement chemicals and

herbicides used for weed control could directly impact salamanders as well through contamination of water. Motor vehicle traffic may kill salamanders foraging at roadside seeps (Cassirer et al. 1995).

Alteration of watershed functions may modify or eliminate suitable Coeur d' Alene salamander habitat. Diversion, damming, hydropower development, timber harvest, road construction, and livestock grazing activities should be considered for potential impacts to watershed functions and water and surface temperatures in Coeur d' Alene salamander habitat.

Potential water quality impacts are significant to Coeur d' Alene salamanders and are associated with sedimentation from timber harvest, road and trail construction, livestock grazing, and other soil disturbing activities. Sedimentation can fill interstitial habitat in and adjacent to streams and diminish habitat for Coeur d' Alene salamanders and aquatic insects, their primary food source. Chemical water contamination may occur as a result of herbicide use for weed control, road dust abatement application, fire retardant, and fuel spills or other contaminants.

Fragmentation of forested habitat through timber harvest could reduce or eliminate movement of salamanders between sites and increase fragmentation of populations with potential for localized extinctions.

Introduced, exotic species such as bullfrogs and non-native fish may prey on salamanders, compete for food, and introduce disease.

PACIFIC GIANT SALAMANDER *(Dicamptodon ensatus)*

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service); State of Idaho, unprotected nongame species.

The Pacific giant salamander is the world's largest terrestrial salamander and can grow to 13 inches in length. This species is most abundant on the Pacific coast and is disjunct in Idaho and parts of Montana. In Idaho, these salamanders are restricted to the north-central forested areas.

Two Pacific giants were observed in Elbow Creek in the Moose Creek ERU and one dead individual was found in East Fork Moose Creek in 1992. Another Pacific giant was documented in White Cap Creek, also in 1992. All four observations were in wilderness. Other observations in the last 5 years were made in Hamby Creek and O'Hara Creek in the O'Hara and Goddard ERU and in Horse Creek in the Meadow Creek ERU. These more recent observations occurred in the front country.

Ecology

Pacific giant salamanders are generally found in moist coniferous forests in elevations from sea level to 7,100 feet. The transformed adults are secretive and seldom found in the open, but can be found in moist forested areas under logs, rocks, and bark, and near mountain streams or on rocky shores of mountain lakes. Adults feed on terrestrial invertebrates, small snakes, shrews, mice, other salamanders, and sometimes birds. They have been in trees at heights up to 6.5 feet. Adults need a water source for reproduction; often this is the headwaters of a mountain stream, a spring, or mountain lake.

Pacific giant salamander larvae are more frequently encountered than adults and may be locally common. They are usually found under rocks in mountain streams, but are also found in mountain lakes and ponds. The larvae are adapted to living in streams and have short, small gills. Larvae feed on a wide variety of aquatic invertebrates as well as some small vertebrates, including fish, tadpoles, or other larval salamanders. (Nussbaum et al., 1983)

Departures from Historic Conditions and Current Threats

Threats to Pacific giant salamanders are associated with degradation of water quality in reproduction sites and disturbance of adjacent forested areas where metamorphosed terrestrial

forms live. Removal or disturbance of rocks, logs, soil, and litter in both the terrestrial and aquatic sites the species inhabits would also be detrimental.

Pacific giant salamanders have low reproductive rates and are more vulnerable to extinction from catastrophic events like fire and floods, and from loss of genetic diversity that could restrict the species' ability to respond to changing environmental conditions. These factors may have significant implications for long-term viability of the species.

Global concern about declining amphibian populations is rising. Amphibians are sensitive bioindicators of environmental change because of their highly permeable skin, trophic positions, and occurrence in fragmented but interconnected populations. The status of salamander populations is one indicator of the overall health of an ecosystem.

Logging, prescribed burns, or road and trail construction near salamander sites in fall and early spring may disturb aboveground breeding activities.

Potential water quality impacts are significant to Pacific giant salamanders and are associated with sedimentation from timber harvest, road and trail construction, livestock grazing, and other soil disturbing activities. Sedimentation can diminish habitat for Pacific giant salamanders and other species they feed on. Chemical water contamination may occur as a result of herbicide use for weed control, road dust abatement application, fire retardant, and fuel spills or other contaminants.

Fragmentation of forested habitat through timber harvest could reduce or eliminate movement of salamanders between sites and increase fragmentation of populations with potential for localized extinctions.

Introduced, exotic species such as bullfrogs and non-native fish may prey on salamanders, compete for food, and introduce disease.

TAILED FROG (*Ascaphus truei*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service); State of Idaho, not listed.

The tailed frog is endemic to the Pacific Northwest and is found in central and north-central Idaho, western Montana, and northwestern California. The tailed frog is the only northwest species of frogs and toads that is highly specialized for life in cold, clear, mountain streams.

Tailed frogs were documented in the wilderness in 1992 in the Moose Creek ERU; they were found in Monument, Elbow, Trout, and East Moose Creeks. Observations of tailed frogs were recorded from the west fork of Wahoo Creek and Pettibone Creek in Pettibone and Bear ERU in 1992 and 1994. In 1992, a tailed frog was observed in Barefoot Creek in White Cap ERU. A population of tailed frogs occurs in a small, deep, and fishless lake in Moose Creek ERU and is the only tailed frog population known to occur in a subbasin lake.

Ecology

Tailed frogs are found from sea level to over 6,600 feet in elevation, in clear, cold, swift-moving, perennial mountain streams or under streamside debris. They may be found on land during wet weather, near water in humid forests, or in more open habitat. In dry weather they stay on moist streambanks. The adults can forage up to 82 feet from the stream in wet conditions, although this generally occurs at night. Adults feed on a wide variety of insects and other invertebrates.

Tailed frogs are small and usually grow to around 2 inches in length. Adult tailed frogs may not breed until 7 to 8 years of age, or 6 to 8 years after metamorphosis. Tailed frog tadpoles have a unique sucker-like mouth that enables them to adhere to rocks and maintain their position in swift currents. Tadpoles feed primarily on diatoms they scrape off rock surfaces. Substantial amounts of conifer pollen have also been found in the guts of tadpoles (Nussbaum et al., 1983)

Departures from Historic Conditions and Current Threats

Threats to tailed frogs are associated with degradation of water quality in reproduction sites and disturbance of adjacent forested areas where metamorphosed terrestrial forms live. Tailed frogs have been found to disappear from streams within logged areas. Removal or disturbance of rocks, logs, soil, and litter in both the terrestrial and aquatic sites the species inhabits would also be detrimental.

Tailed frogs have low reproductive rates and are more vulnerable to extinction from catastrophic events like fire and floods and from loss of genetic diversity that could restrict the species' ability to respond to changing environmental conditions. These factors may have significant implications for long-term viability of the species.

Global concern is rising about declining amphibian populations. Amphibians are sensitive bioindicators of environmental change because of their highly permeable skin, trophic positions, and occurrence in fragmented but interconnected populations. The status of amphibian populations is one indicator of the overall health of an ecosystem.

Logging, prescribed burns, or road and trail construction near salamander sites in fall and early spring may disturb aboveground breeding activities. Potential water quality impacts are significant to tailed frogs and are associated with sedimentation from timber harvest, road and trail construction, livestock grazing, and other soil disturbing activities. Sedimentation can diminish habitat for tailed frogs and other species they feed on. Chemical water contamination may occur as a result of herbicide use for weed control, road dust abatement application, fire retardant, and fuel spills or other contaminants.

Fragmentation of forested habitat through timber harvest could reduce or eliminate movement of salamanders between sites and increase fragmentation of populations with potential for localized extinctions.

Introduced, exotic species such as bullfrogs and non-native fish may prey on salamanders, compete for food, and introduce disease. For example, a population of tailed frogs occurs in a small, deep, and fishless lake in the Moose Creek ERU; it is the only tailed frog population known to occur in a subbasin lake. Introduction of fish to the lake would threaten the tailed frog population. It is unknown whether other artificially stocked lakes in the subbasins may have sustained tailed frog populations prior to fish introduction.

RING-NECKED SNAKE (*Diadophis punctatus*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service); State of Idaho, unprotected nongame species of special concern.

Distribution of ring-necked snakes is spotty in the western United States, extending from the Pacific to the Atlantic coast, and from Nova Scotia, Minnesota, Colorado, Idaho, and Washington, south across the U. S. to the Florida Keys and northern Baja California. The Oregon, Washington, and northwestern Idaho subspecies inhabiting the subbasins is *Diadophis punctatus occidentalis*.

In Idaho, ring-necked snakes are found in coastal disjunct areas over much of the state but few records of occurrence exist. In the subbasins, the ring-necked is occasionally found along the Middle Fork Clearwater River and the lower Selway River. The ring-necked is thought to be venomous but not dangerous to humans.

Ecology

Ring-necked snakes are most commonly found in forested areas, but they also occur in open, grassy, or shrubby areas and in relatively open, rocky canyons. They are found under rocks and rotting logs or other debris, and in talus. Ring-necked snakes feed primarily on salamanders and lizards but may also eat insects, frogs, earthworms, and smaller snakes.

Ring-necked snakes are inactive in winter in most areas and communal nesting is common. In Idaho, they probably leave the den in March to May and return in September or October. They are nocturnal and hide underground, in logs, or under surface cover during the day. A Kansas study estimated population density at 283 to 729 per acre and distances between recaptures averaged 262 feet. Home ranges had a maximum dimension of about 459 feet (Nussbaum et al., 1983).

Departures from Historic Conditions and Current Threats

Threats to ring-necked snakes are associated with removal or disturbance of logs, rocks, talus, and litter in the terrestrial sites the species inhabits.

Ring-necked snakes have low reproductive rates and are more vulnerable to impacts from catastrophic events like fire and floods and from loss of genetic diversity that could restrict the species' ability to respond to changing environmental conditions. These factors may have significant implications for long-term viability of the species.

Logging, prescribed burns, road and trail construction, and herbicide use within or near ring-necked sites may impact reproduction activities.

Fragmentation of forested habitat through timber harvest could influence movement of ring-necked snakes between sites and increase fragmentation of populations.

SHIRA'S MOOSE *(Alces alces shiras)*

Status

Status Designation: Federal, management indicator species, Nez Perce National Forest, Forest Service Northern Region (USFS); State of Idaho, hunted species.

Shira's moose is a hunted species in Idaho and is designated a management indicator species on the Nez Perce National Forest. The range of Shira's moose extends from Alaska and Canada, south through the Rocky Mountains, the northern Great Lakes, and northern New England.

Although infrequently seen, moose are widespread in the subbasins. Abundant suitable habitat occurs in the more mesic ERUs including Moose Creek, Pettibone and Bear, Gedney and Three Links, Meadow Creek, O'Hara and Goddard, and upper Clear Creek. Moose also frequent the lower Selway River canyon.

Ecology

Shira's moose prefer mosaics of second-growth forests, openings, lakes, and wetlands. In Idaho, moose prefer shrubby, mixed coniferous and deciduous forests with nearby lakes, marshes and bogs. Moose require water bodies for foraging. They avoid hot summer conditions by utilizing dense shade or bodies of water. Moose also use even-aged pole timber and open areas in summer. Moose favor flat ground and rolling slopes and avoid steep slopes.

In the subbasins, old-growth grand fir-Pacific yew stands are critical winter habitat. Grand fir-Pacific yew habitats occur in the headwaters of the South Fork of Clear Creek and the headwaters of the West Fork of O'Hara Creek, although they have been fragmented by timber harvest. Grand fir-Pacific yew stands also occur across the uplands of the west face of Meadow Creek.

A northwestern Montana study found about 50 percent of fall, winter, and spring moose locations were in old growth. Logged areas were used more in early winter, while dense timber, often in draws and stream bottoms, received more use in mid to late winter. Streamside complexes of willow bottoms and conifers are an important component of winter range (Smith, 1962; Peek, 1974), and proximity to water is notable year-round.

Year-round, moose chose clearcuts and other logged areas of less than 30 acres, and 15 to 30 years old. Although use of unlogged sites was less than expected based on availability, moose were found in these areas more than 50 percent of the time.

Significant increase in the use of stream bottoms and draws in May through October is notable. Stream bottoms, draws, and swamps within stands of mature timber with good canopy closure provide hiding and thermal cover, and are heavily used for summer feeding. These areas, in conjunction with aquatic feeding sites and calving sites, have been identified as key habitat components in the Yaak ecosystem in Montana.

Good calving sites provide dense hiding cover and proximity to water and forage and are usually in mature to old-growth stands greater than 150 acres. Cows with calves have been found to use older, wetter, more thickly vegetated sites than cows without calves.

Moose have been known to strongly select habitats with abundant forage except in hot summer conditions or periods of deep snow, when they retreat to forest stands providing a thermal umbrella. In summer, moose browse on new growth of trees and shrubs and on aquatic vegetation. In winter, conifer and hardwood twigs from menziesia, yew, alder, maple, and willow are the most important food sources.

Moose are active day or night, but are primarily crepuscular. Depending on habitat, a home range may reach several thousand acres. An Idaho study found cow moose to range from 6 to 10 square miles and bulls from 12 to 20 square miles in summer. Winter home range was 5 to 6 square miles. Population densities have been reported from three to five moose per square mile. Moose sometimes herd in winter and snow accumulation may affect populations more than predation. Favorable conditions for moose may produce large annual increases in population size of 20 to 25 percent that can lead to habitat degradation and a subsequent population crash.

Departures from Historic Conditions and Current Threats

Moose habitat availability is largely a reflection of natural disturbance dynamics, notably fire, in the subbasins. Much of the mesic habitat moose depend on is significantly beyond expected fire return intervals. Fire maintains mosaics of early seral structure and old growth that moose require for year-round habitat. Fire invigorates shrubs and initiates resprouting, producing additional forage for moose.

Mature bull moose are preferred by most hunters and are therefore more vulnerable to mortality during hunting season than other classes of moose. Lack of mature bulls in a herd can disrupt breeding seasons, conception dates, and calf survival. Younger bulls may breed later over a longer time period in the fall than mature bulls. This could result in longer calving seasons with many calves born late. Late born calves may spend less time feeding on high quality forage and enter winter in poorer condition

Bull moose are particularly vulnerable to open roads in hunting season. On national forest lands in the subbasins, the highest open road density is 4 to 5 miles per square mile and occurs in upper Clear Creek and extends into lower Clear Creek on private land. The high density area in upper Clear Creek also connects with national forest lands west of Pine Knob that have an open road density of 2 to 3 miles per square mile and adjacent densities up to 2 miles per square mile. Open road densities of 2 to 3 miles per square mile also occur on national forest between Smith Creek and Pete King Creek on the north face of the Middle Fork Clearwater, and west of the mouth of Meadow Creek in association with Slim's Camp Road and Falls Point Road.

Motorized access closures are frequently breached and resources for monitoring and enforcement are inadequate. Access violations increase actual open road density and moose vulnerability. Motorized vehicle use of trail access also occurs throughout the non-wilderness portion of the subbasins. Meadow Creek ERU is considered primarily roadless, but 14 out of 22 trails are open to motorized use.

Wintering moose are also vulnerable to effects from motorized vehicle access. Roads open to snowmobiles in moose winter range occur in all the front country ERUs and in Upper Selway Canyon and Deep Creek ERUs in the wilderness portion of the subbasins. Road 464 is a groomed snowmobile trail on the Selway American River divide; it accesses grand fir-Pacific yew

habitat in the West Fork of O'Hara Creek. Although fragmented from timber harvest, the limited grand fir-Pacific yew communities provide critical winter moose habitat.

Climax meadows associated with lakes and other water sources provide important moose habitat. Lake habitats are most represented in White Cap, Pettibone and Bear, Moose Creek, and Gedney and Three Links ERUs. Significant meadow complexes occur in upper Meadow Creek, North Moose, Rhoda Creek, and Goat Creek. These meadows are also valued for campsites and pack stock grazing that can displace moose and reduce forage availability.

Unauthorized salting is a frequent problem in the backcountry that increases moose vulnerability through habituation and may promote artificial distribution patterns.

ALPINE HABITATS AND ASSOCIATED SPECIES

Alpine habitats are the least common habitat aggregation in the subbasins and represent only 7 percent of the habitats (Maps 50 and 53). They occur on the high elevation divides that separate the Selway River from the Lochsa, Bitterroot, and Salmon Rivers, and on other high elevation ridges within the subbasins. Key habitat features in the alpine aggregation include whitebark pine communities, montane meadows, massive rock formations and talus, and high lakes environments.

Alpine habitats include habitat type groups (HTGs) 10 and 11. They are characterized by cold and moderately dry subalpine fir and cold whitebark pine and subalpine fir. Alpine habitats are dominated by open stands of whitebark pine, lodgepole pine, alpine larch, subalpine fir, and Engelmann spruce. Understories consist of grouse whortleberry and smooth woodrush. Alpine habitats are limited to high elevation ridges and upper slopes and contain the majority of the rock component in the subbasins. The following table describes the elements of the alpine habitat aggregation.

Table 4.44: Alpine Habitat Aggregations

Alpine Habitats				
Structure	Early Seral	Mid-seral	Late Seral	Old Growth
Potential Vegetation	HTG 10-11; 80	HTG 10-11	HTG 3-9	HTG 10-11
Size Class	Herbaceous, shrub, seedling, sapling, pole	9-21 in dbh	$\geq$ 21 in. dbh and not old tree	Old tree

dbh=diameter at breast height

Current Departures from Historic Conditions

Whitebark pine has been significantly diminished and is a key component of grizzly bear habitat. Fire suppression and blister rust disease are the major factors in the decline. Montane park has significantly increased, also due to fire suppression. Native amphibian populations are at risk or obliterated at lakes stocked with introduced fish, especially brook trout. Some roads and trails with motorized vehicle use access alpine habitats and species. Disturbance sensitive species, including mountain goats and wolverines, may be influenced by the concentrated human activity.

Representative Species Associated with Alpine Habitats:

- Carnivores: Grizzly bear, wolverine
- Birds: Clark's nutcracker
- Amphibians: Spotted frog
- Ungulates: Rocky Mountain goats
- Lagomorphs: American pika

GRIZZLY BEAR *(Ursus arctos horribilis)*

Status

Status Designation: Federal, threatened species (U. S. Fish and Wildlife Service) and management indicator species, Nez Perce National Forest, Forest Service Northern Region (USFS); State of Idaho, threatened species.

Current grizzly bear range includes Alaska, northern and western Canada, the Cabinet-Yaak Mountains, the northern Continental Divide ecosystem in Montana, the Selkirk Mountains in Montana and Idaho, the northern Cascades in Washington, and Yellowstone Park in Wyoming, Montana, and Idaho.

Seventy-eight percent of the Selway subbasin is within the Selway-Bitterroot Wilderness Area, which comprises the majority of the proposed Bitterroot Grizzly Bear Recovery Area in the Bitterroot ecosystem, as described in the *Grizzly Bear Recovery In The Bitterroot Ecosystem: Final Environmental Impact Statement* (USFWS, 2000). The Bitterroot ecosystem is one of the largest contiguous blocks of federal land remaining in the lower 48 United States. The core of the ecosystem contains two wilderness areas, the Selway Bitterroot and the Frank Church River of No Return Wildernesses, which make up the largest block of wilderness habitat in the Rocky Mountains south of Canada. Of all remaining unoccupied grizzly bear habitat in the lower 48 states, this area in the Bitterroot Mountains is thought to have the best potential for grizzly bear recovery, primarily due to the extensive wilderness area (USFWS, 2000).

In 1991, a 5-year habitat evaluation concluded that the Bitterroot ecosystem can support a viable grizzly bear population based on biological factors associated with space, isolation, denning, vegetation types, and food (Davis and Butterfield, 1991). Officially, grizzly bears do not permanently occupy any portion of the Nez Perce National Forest or any part of the Selway subbasin. However, evidence of grizzly bear presence was confirmed in Gash Creek, adjacent to the wilderness on the Montana side in 1978. Chuck Jonkel, University of Montana grizzly researcher, confirmed grizzly hair samples collected by a grizzly food habits researcher (Jonkel, 1992). Other credible reports of grizzly sightings and sign by long time Forest Service field employees working in the Selway-Bitterroot Wilderness and local hunters in the last 20 years have not been confirmed.

Ecology

Optimum and Available Habitat: Optimum grizzly habitat is thought to include extensive timbered areas that provide security cover adjacent to or continuous with grassland-herbland, shrubland, or other open-site feeding areas. Daybeds, used for resting between feeding periods, are usually located in relatively open timber stands immediately adjacent to open area feeding sites (Knight, 1977; Craighead and Craighead, 1972).

Grizzly bears are considered to be wilderness dependent because of their large space requirements and need for remote habitats with minimal disturbance. In the subbasins, the almost one million acres of the Selway-Bitterroot Wilderness provide extensive roadless security to grizzly bears. Moose Creek ERU probably provides the largest amount of preferred habitat for grizzlies. Alpine habitats and shrublands adjacent to mature forest are abundant in Moose Creek. The Pettibone and Bear ERU also provides important habitat but is lacking in adjacent shrublands and mature forest. The Gedney and Three Links ERU has extensive shrublands but also lacks mature forest adjacency. White Cap Creek ERU provides substantial alpine denning habitat but is deficient in shrubland forage.

Forage: Grizzly range west of the continental divide in northwestern Montana and northern Idaho is primarily mountainous with maritime climatic influences. Grizzlies rely on diverse habitats for foraging in this region. Important grizzly bear food sources in the Bitterroot ecosystem include whitebark pine nuts, huckleberry fruits, serviceberry, cherry, elderberry, buffalo berry, and mountain ash (USFWS, 2000). Burned areas producing these shrubs are the primary feeding

areas. Before and after shrublands produce fruit, grizzly diet is probably dependent upon protein from early grass and herbs and starchy underground plant parts, which occur primarily in non-forested habitat components, including avalanche chutes, sidehill parks, wet meadows, stream bottoms and other moist sites. These components probably entirely replace shrublands as energy sources during years when fruits fail or in areas lacking fleshy fruit-bearing shrubs (USFS and NPS, 1979).

According to Wright (1909), leaves of shooting star (*Dodecatheon*) were highly preferred forage in the Selway Bitterroot area and hoary marmots and Columbian ground squirrels were eaten in abundance by the bears prior to denning up for winter. After the early fish runs and before berry season, Wright noted grizzlies foraged extensively on ants, grubs, and larvae that were dug from logs and stumps and from under rocks. Wright also noted the historic importance of anadromous fish, especially in fall, to grizzlies in the Selway Bitterroot Mountains, where he observed them fishing on numerous occasions in traditional locations and seasons.

Home Range: Grizzlies west of the continental divide appear to use far less space than grizzlies east of the divide in and around Yellowstone Park. Grizzly range west of the divide, including the Selway Bitterroot area, has a moist maritime climate and steep, precipitous terrain. These conditions account for the high ecological and vegetative diversity characteristic of the area resulting in more abundant habitat. Berry scarcity and large pine seed crop fluctuations can be important factors limiting bear density.

Home range is highly variable among areas, seasons, and individuals. A Selkirk study reported adult home ranges of 87 to 175 square miles, with the male's range generally larger than the female's. The density of the Selkirk population was about one bear per 15 square miles.

Hibernation: In Idaho, hibernation occurs from October through May. Grizzlies typically dig their own dens, usually on steep northern slopes where snow accumulates. Most dens are at higher elevations from 6,724 to 8,200 feet (Servheen and Klaver, 1983).

Departures from Historic Conditions and Current Threats

Historically, grizzlies were common in the subbasins until the early 1900s. Lewis and Clark found grizzlies more often than black bear in their travels along the Clearwater River. Wright's 1909 accounts of his grizzly hunting expeditions in the west documented numerous grizzly killings and encounters in the Selway Bitterroot area. Accounts include grizzlies killed at Elk Summit in the Moose Creek ERU and grizzlies frequenting a large marsh on a divide between the middle and south forks of the Clearwater River. Based on conservative estimates, Bud Moore (1986) concluded that trappers harvested 25 to 40 grizzlies annually in the Selway Bitterroot Mountains near the turn of the century. By the 1950s grizzly bears were virtually extirpated in the Selway Bitterroot Mountains due to intensive hunting, trapping, predator control programs, and the decline of anadromous fish runs (USFWS, 2000).

Potential threats to grizzly bears in the subbasins include risks of direct human caused mortalities, bear baiting, artificial foods and attractants associated with dispersed camps and campgrounds, outfitter camps, administrative sites, and private wilderness inholdings. Potential indirect impacts affecting grizzly habitat include trail construction and maintenance that provides increased access to grizzly habitat, road conflicts, grazing, and fire suppression that impacts forage, including whitebark pine communities and early seral ungulate habitat.

Historically, whitebark pine was an important nutritional and structural component of grizzly habitat in the Bitterroot ecosystem and occurred across 12 to 15 percent of the landscape. Today, whitebark pines have been reduced to about 20 to 40 percent of their original abundance through fire suppression and blister rust disease. Whitebark pine is expected to decline to about 5 to 10 percent of its original abundance, but is anticipated to respond positively to fire restoration (USFWS, 2000). Anadromous fish were historically important in the diet of Selway Bitterroot grizzly bears until construction of the Lewiston Power Dam in 1927 eliminated the native chinook salmon runs. Although salmon and steelhead were reintroduced, anadromous fish numbers today

are significantly diminished compared to historic runs. Mesic shrublands and montane meadows that provide important grizzly food sources have declined with fire suppression in the subbasins.

Roads have a detrimental effect on grizzly bears by increasing human access, resulting in increased vulnerability to bear populations. In the North Fork of the Flathead River in Montana, all 29 known or suspected deaths between 1979 and 1988 were due to legal or illegal hunting and most bears were shot from roads (USFWS, 1993). Once total road densities exceed 2 m/m^2, use by grizzlies is predicted to decline (Mace and Manley, 1993).

Although the lower portion is roaded, most of the subbasins are within the core Bitterroot ecosystem recovery area, which is primarily roadless. However, bears migrating outside the subbasins to the north or east would encounter Highway 12 to the north and Highway 93 to the east. Also, several roads within the subbasins provide access to high elevation grizzly habitat in the core recovery area. These habitats are located at Elk Summit in Moose Creek ERU, Nez Perce Pass in Deep Creek ERU, Fog Mountain in Gedney and Three Links ERU, and Coolwater Ridge in North Selway Face ERU. Within the roaded portion of the subbasins, the highest open road densities are in the Clear Creek ERU. These densities range from 2 to 3 m/m^2 to 4 to 5 $m/m^{2.}$ Open road densities of 2 to 3 m/m^2 also occur in Middle Fork Clearwater ERU on the north face. Some of these roads are closed during fall hunting season, which decreases vulnerability in that season.

Other hunting related threats in the subbasins include black bear hunting and associated bear baiting. Since 1985, 15 protected grizzlies have been mistakenly shot by hunters during spring black bear season in Montana (Associated Press, 2000). Black bear baiting leads to increased vulnerability of grizzly bears that are also attracted to the bait.

Natural or pristine grizzly behavior is usually expressed through a total dependence on natural foods under free-ranging conditions. Normally this means that bears are not adapted to contacts with humans and usually avoid human encounters. However, grizzlies that forage on human food, garbage, or livestock in close proximity to people become habituated to people (Herrero, 1976). This modified behavior increases grizzly-human conflict potential and threatens both human safety and grizzly bear recovery.

WOLVERINE *(Gulo gulo)*

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service) and sensitive species, Forest Service Northern Region (USFS); State of Idaho, species of special concern.

Wolverine range extends from Labrador, east to Alaska, and south to mountainous regions of the western United States. In Idaho, wolverine distribution includes mountainous areas from the South Fork of the Boise River, north to the Canadian border (Groves, 1988).

The wolverine is federally designated a candidate species by the U. S. Fish and Wildlife Service and is considered a sensitive species by the Forest Service Northern Region. It is illegal to kill wolverines in the state of Idaho.

Wolverine sightings in the subbasins are rare, but occasionally occur in alpine lake basins in summer and at lower elevations in winter. Wolverines have been reported in the Gedney and Three Links, North Selway Face, Upper Selway Canyon, Meadow Creek, and O'Hara and Goddard ERUs.

Ecology

Wolverine populations that have been or are now on the edge of extirpation exist in the last available habitat that has not been developed, extensively modified, or accessed by humans. The wolverine is a conservation enigma because knowledge is lacking about factors that allow populations to persist in some areas and not in others. Although most wolverine sightings are in

high elevation habitats, their occurrence there may be more a function of remoteness and inaccessibility by humans than it is a required habitat attribute (Ruggiero, 1994). But temperature also influenced summer movements to higher elevations according to Hornocker and Hash (1981). Wolverines of both sexes moved to higher, cooler elevations and traveled less during daylight hours. They remained at these high elevations throughout the summer.

Habitat Preferences: In Idaho, wolverines inhabit remote, mountainous areas with little human disturbance. They are considered to be a "wilderness sensitive" species in much of the literature (Hayward and Garton, 1989) because of their dependency on remote habitat with minimal disturbance that is not often found outside wilderness. Hornocker and Hash (1981) studied wolverines in the South Fork of the Flathead River drainage and found that wolverines selected grand fir-subalpine fir cover types throughout the year, but especially in summer. Fifty-six percent of wolverine locations were in grand fir-subalpine fir types when all seasons were averaged.

Wolverines were rarely located in burned-over areas or wet meadows, and dense young timber received the least use. However, seral lodgepole pine and western larch sites were frequently used. Hornocker and Hash (1981) suggested that food availability is the main factor determining movements and range of wolverine in the South Fork drainage. Carrion and prey items were apparently more available in mature or intermediate stands preferred by wolverines, particularly the edge and ecotonal areas around cliffs, slides, blowdowns, basins, swamps, and meadows. Temperature also influenced summer movements. Wolverines of both sexes moved to higher, cooler elevations and traveled less during daylight hours. They remained at these high elevations throughout the summer.

Lower elevations were used more in winter than in summer. Mean winter elevation was 4,497 feet and mean summer elevation was 6,298 feet. Although all aspects were used, eastern and southern exposures were used more consistently. Wolverines used a variety of topographic positions. Slopes were used in 36 percent of the locations, basins in 22 percent, wide river bottoms in 14 percent, and ridge tops in 8 percent.

Wolverines appeared to meander through timber, but traveled in straight lines across large openings. No wolverines were relocated in a clearcut of any size, but tracks were seen to cross clearcuts 15 times. Wolverines were located within 0.62 to 1.86 miles of clearcuts and active roads 12 times. Males were found farther from clearcuts, roads, and burns than females.

No differences in wolverine density, movement, habitat use, or behavior were found between the managed and wilderness portions of the South Fork drainage. Hornocker and Hash (1981) attributed these findings to an effective separation of humans and wolverines due to limited human access in winter and use of higher elevations by wolverines in summer. However, humans caused 15 of 18 known wolverine mortalities between 1972 and 1977.

Home Range: Hornocker and Hash (1981) found that individual wolverines ranged widely. Average yearly ranges were 163 square miles for males and 58 square miles for females. Male wolverines have been found to disperse at sexual maturity for distances up to 115 miles. Because of the large home range requirements of wolverines, scales for wolverine habitat analysis must also be large.

Forage: Wolverines feed on a variety of roots, berries, small mammals, bird eggs, fledglings, and fish. They may attack moose, caribou, and deer hampered by deep snow. Small and medium size rodents and carrion, especially ungulate carcasses, comprise a large percentage of the diet. Carcasses of mule deer and elk were the primary ungulates in the diet of wolverines in Montana (Hornocker and Hash, 1981 in Ruggiero, 1994).

Breeding: Breeding occurs from April through October, but is usually in summer. In Idaho, females use high-elevation basins for natal sites (Copeland, 1996). The proximity of rocky areas, such as talus slopes or boulder fields, for use as dens or rendezvous sites was important for wolverines in Idaho (unpublished data in Copeland, 1993 in Ruggiero, 1994). Natal dens in

Montana were most commonly associated with snow-covered tree roots, log jams, or rocks and boulders (Hash 1987 in Ruggiero, 1994).

Departures from Historic Conditions and Current Threats

Threats to wolverine populations are difficult to determine because of a lack of knowledge about factors that allow populations to persist in some areas and not in others. Wolverines are difficult to detect even when relatively abundant. Since wolverines have large home ranges, sightings may not indicate reproducing populations. Conversely, a lack of sightings does not indicate a lack of presence. This makes effects of management activities difficult to determine.

Barriers to dispersal can affect colonization of vacant habitat. Cumulative impacts of trapping, habitat alteration, timber harvest, and forest access on wolverines is not understood. Impacts to mating pairs and family groups from recreation in alpine areas in summer should be considered.

Human Presence and Activities: Human presence may conflict directly with wolverines. Hornocker and Hash (1981) suggest that human access on snowmobiles or all-terrain vehicles in winter and early spring could cause behavioral disturbance in addition to potential for increased mortality associated with ease of access for fur trappers.

Incidental non-target trapping and hunting mortality is the primary mortality factor for wolverines. The persistence of wolverine populations in Montana despite years of unlimited trapping and hunting has been attributed solely to the presence of designated wilderness and remote, inaccessible habitat (Hornocker and Hash, 1981).

Natural Threats: Predation by large carnivores, especially on kits, may be important. Adult males may kill kits and may kill each other in the breeding season. Starvation may be an important mortality factor for very old and very young wolverines that are unsuccessful at foraging even when food is abundant. Other threats include low reproductive rates and delayed sexual maturity.

CLARK'S NUTCRACKER (*Nucifraga columbiana*)

Status

Status Designation: Federal, not listed; State of Idaho, protected nongame species.

The Clark's nutcracker is a protected nongame species in Idaho. It is a resident from central British Columbia, southwestern Alberta, western and central Montana, and western and southeastern Wyoming, south through the mountains of central Washington, eastern Oregon, and central and eastern California and Nevada, to northern Baja California. Clark's nutcracker also occurs in the Rocky Mountains to east-central Arizona and southern New Mexico and may wander irregularly beyond its normal range.

Ecology

Clark's Nutcracker and Whitebark Pine: Clark's nutcracker distribution coincides with whitebark pine in the subbasins. The nutcrackers harvest and store pine nuts by burying them in many small seed caches in mineral soil or duff (Tomback, 1978). Seeds are cached at distances of several feet to 14 miles from harvest sites, but the highest densities of seeds are found near parent trees (Hutchens and Lanner, 1982).

The Clark's nutcracker disperses more whitebark pine seed than any other organism and is the primary agent of regeneration. The influence on whitebark pine regeneration and the seed caching behavior are important to grizzly bear habitat and diet. In typical open, high elevation stands of whitebark pine, Clark's nutcracker takes 99 percent of available whitebark pine seed. An individual nutcracker caches many times the amount of seed that it requires, leaving the remaining seeds in the soil to germinate. Many whitebark cone features are the product of its coevolution with Clark's nutcracker. Cone morphology favors nutcracker collection, and in turn, the nutcracker disseminates the seed.

The nutcrackers begin harvesting and caching whitebark pine seeds around mid August when seeds are ripe. Sometimes large flocks of up to 150 birds have been observed caching seed together. Clark's nutcrackers are attracted to open sites for seed caching and will fly great distances to use them.

They uncover the seeds during winter and spring when other seeds are scarce. Seed uncovered in spring is almost exclusively fed to fledglings. The availability of whitebark pine seed allows the Clark's nutcracker to nest earlier than other passerine birds that must wait for insect populations to occur before nesting. This results in Clark's nutcracker fledglings being more mature by winter and better able to survive.

Forage: Pine seeds are the primary food for both adults and nestlings but individuals will also eat insects, berries, snails, carrion, and sometimes eggs and young of smaller birds. Nearly all winter food and much of the breeding season food is derived from pine seeds collected and stored in fall.

Nesting: Clark's nutcrackers nest primarily between 6,000 feet and 8,500 feet (Mewaldt, 1956). They build cup-shaped nests in trees and both sexes incubate two to six eggs for 17 to 18 days. Young leave the nest at 24 to 28 days.

Departures from Historic Conditions and Current Threats

Threats to Clark's nutcracker include the severe decline in whitebark pine communities in the assessment area due to fire suppression and blister rust disease

SPOTTED FROG (*Rana pretiosa*)

Status

Status Designation: Federal, candidate (C2) species (U. S. Fish and Wildlife Service); State of Idaho, species of special concern and unprotected nongame species.

Ecology

Spotted frog range extends from extreme southeastern Alaska, south through western Alberta to coastal Oregon and Washington, and east to northern Wyoming, northern Utah, and central Nevada.

In Idaho, spotted frogs occur throughout much of the northern part of the state. There are also some isolated populations in southwestern Idaho. Spotted frog populations occur at many of the high alpine lakes in the Selway and Middle Fork subbasins.

Habitat Preferences: Spotted frogs are highly aquatic and are generally found in or near permanent bodies of water such as lakes, ponds, sluggish streams, and marshes. Spotted frogs prefer littoral zones comprised of emergent vegetation including grasses, sedges, and thick algae, but may use sunken, dead, or decaying vegetation as escape cover. During the summer these frogs can be found some distance from breeding sites, but still associated with moist vegetation. During the latter part of the summer, they disperse to permanent water from meadows and transitory ponds. In a complex with four pools in Yellowstone National Park, Wyoming, movement occurred between ponds due to breeding, hibernation, and the drying of other ponds and watercourses at a maximum of 208 yards per day with a maximum of .8 mile (Turner, 1960).

Egg Laying: Egg laying in high elevation lake basins probably occurs within a two week period in late June and early July. In mountain and interior sites, tadpoles are thought to overwinter as larvae, metamorphosing the following spring (Nussbaum, 1983). In higher elevations in Wyoming, spotted frogs grow more slowly and mature at a later age with males maturing at four years and females maturing at six years. Females breed only every two or three years at higher elevations.

Forage: Spotted frogs are opportunistic and eat a wide variety of insects as well as mollusks, crustaceans, and arachnids. Larvae eat algae, organic debris, plant tissue, and minute water-borne organisms.

Departures from Historic Conditions and Current Threats

Stocked fish in many high mountain lakes within the subbasins have negatively affected spotted frogs. In fishless lakes spotted frog populations are generally common to abundant. In lakes stocked with fish, especially brook trout, spotted frog populations are often absent or significantly reduced. Fish prey upon spotted frogs, especially where fish populations are high and other food sources are limited. Stocked fish may also significantly impact insect populations that are important in the diet of spotted frogs.

Threats to spotted frogs also include predation by introduced bullfrogs in lower elevations. Although bullfrogs have been observed within the Clearwater River basin adjacent to the assessment area, none have been documented within the Selway and Middle Fork assessment area.

ROCKY MOUNTAIN GOAT *(Oreamnos americanus)*

Status

Status Designation: Federal, not listed; State of Idaho, game species, some parts of Idaho.

Rocky Mountain goat range extends from southeastern Alaska, south to Washington, western Montana and southern Idaho. The Rocky Mountain goat was introduced in Colorado, Oregon, the Olympic Peninsula of Washington, and South Dakota. Some Idaho populations were introduced outside their historic range. The Rocky Mountain goat is designated a game species in some areas of Idaho, but not in the Selway and Middle Fork Clearwater subbasins.

Extensive spring and winter mountain goat range exists in the subbasins, primarily on the east side of the Selway River. Significant range occurs in the Upper Selway Canyon, White Cap, Pettibone and Bear, and Moose Creek ERUs. The White Cap and Pettibone and Bear Creek ERUs and the Bitterroot and White Cap Creek divide ridges that bound the drainages contain the most significant alpine rock component in the analysis area, which indicates important summer range for mountain goats. Mountain goats have also been observed wintering in Meadow Creek and summering on the ridge divide between Meadow Creek and Running Creek.

Ecology

Mountain goats are considered to be a “wilderness sensitive” species in much of the literature (Hayward and Garton,1989) because of their dependency on remote habitat with minimal disturbance that is not often found outside wilderness. They inhabit the upper elevations of the northern Rocky Mountains in alpine and subalpine habitats on steep, grassy, talus slopes, grassy ledges of cliffs, or alpine meadows. Summer habitat is typically found at higher elevation than winter habitat (Rideout, 1974; Smith, 1976; Singer and Doherty, 1985; Hayden, 1989). Cliffs are especially important habitat components.

Mountain goat winter ranges in the Bitterroots are characterized by steep broken terrain dominated by tiered cliffs with steep slopes, southerly exposures, and wind action contributing to excellent snow-shedding properties (Smith, 1976). Between January and May 94 percent of goat observations were between 4,200 to 6,500 feet, while nearly all summer location observations were above 7,300 feet. Cirques are used heavily in summer, fulfilling all habitat needs in that period by providing abundant lush forage, water, bedding, and escape terrain. Northerly and easterly aspects were used 67 percent of the time in summer; lush sedge-forb mats were available on these exposures. Subalpine fir or alpine larch overstory was present for 60 percent of summer locations.

Mountain goats move in October and November and April and May. In Idaho, they may move up to 10 miles in winter to appropriate habitat. One Idaho band of 10 animals wintered in a 200-acre area. In winter, mountain goats occupy the lowest suitable range on south-facing aspects. Mature females dominate their strong social hierarchy. Adult females and young may form small groups in summer. Males are often solitary or sometimes in male groups, but join female groups in fall. Annual average home range in different areas of Montana was reported at 2.3 to 9 square miles.

Mountain goats graze on grasses and forbs in summer and also browse shrubs and conifers. The winter diet is often variable. They may feed on mosses and lichens, as well as grasses, shrubs, and conifers.

Departures from Historic Conditions and Current Threats

Historic population status of mountain goats in the analysis area is unknown. Limited surveys indicate that mountain goats are declining due to a decrease in the kid population. Factors influencing goat populations apart from natural mortality include quality of habitat and security. Important mountain goat spring-winter range in the upper Selway area is heavily infested with weeds that impact limited winter forage, especially in the White Cap and Pettibone and Bear Creeks ERUs. An extensive artificial salt lick on White Cap Creek located between two goat ranges has potential to impact goats, who are easily habituated to salt, by increasing their vulnerability to predation and mortality by humans. Snow machine access to mountain goat wintering areas in the upper Selway may impact mountain goat security in restricted habitats. Motorized access to alpine summering areas also has potential to influence mountain goats that are sensitive to disturbance and may be displaced. Mountain goats occupy very specific and limited habitats on precipitous terrain to avoid predators; disturbance impacts that cause displacement are potentially significant compared to other species with more general habitat requirements.

AMERICAN PIKA (*Ochotona princeps*)

Status

Status Designation: Federal, not listed; State of Idaho, protected nongame species.

The American pika is a protected nongame species in Idaho. It is distributed discontinuously in mountainous areas from southern British Columbia and southern Alberta, south to southern California, Nevada, southern Utah, and northern New Mexico, and east to Wyoming and Colorado. The pika is most often found in the analysis area associated with talus slopes in alpine environments. Current population status in the area is unknown.

Ecology

Pikas are found from sea level to about 9,840 feet in the northern range, infrequently below 8,200 feet in the south. They are restricted to rocky talus slopes and primarily the talus and meadow interface. Pikas are often found on high alpine slopes at about 8,850 feet and above tree line up to the limit of vegetation. They are also found at lower elevations in rocky areas within forests or near lakes

Pikas feed primarily on grasses and sedges, but also consume flowering plants and shoots of woody vegetation. In late summer and fall, they harvest and store food and defend hay piles built for winter consumption. They may forage in winter in snow tunnels.

Pikas are active all year. They are relatively inactive on warm days and may be inactive at midday in hot weather near the lower elevation limit. Pikas do not dig burrows but may enlarge den or nest sites under rock. They may defend territories of about 480 to 840 square yards. Their home range is about twice that size, but varies seasonally and is the most extensive during spring breeding season. Male and female territories are the same average size. Adjacent home ranges tend to be occupied by opposite sexes. A Colorado study found a population density of 3 to 10 for about 2.5 acres in favorable habitat in mid-August. Density-related social behavior maintains population stability. Young are born between May and September. Females produce one to two litters of two to five young per litter. Juvenile pikas establish territories and hay piles, but do not breed until their second summer. Juveniles tend to stay on natal or adjacent home range. Individuals may live 5 to 7 years. Adult mortality is 37 to 56 percent per year.

Departures from Historic Conditions and Current Threats

The historic population status of pikas in the analysis area is unknown. Potential threats to pikas may be associated with habitat loss, including forage reduction caused by trampling or grazing. Other potential threats include increased predation by raptors, like ospreys, that may be attracted to alpine lakes environments by the presence of large populations of non-native fish in the lakes.

OTHER IMPORTANT SPECIES GROUPS

BATS

The analysis area supports a species diverse population of bats as evidenced by a bat survey at Moose Creek Ranger Station in August of 1998. Seven different species were netted in one night, which was an Idaho record. Species netted include the silver-haired bat (*Lasionycteris noctiuagans*), big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), Yuma myotis (*Myotis yumanensis*), long-eared myotis (*Myotis evotis*), small footed-myotis (*Myotis ciliolabrum*), and fringed myotis (*Myotis thysanodes*).

FRINGED MYOTIS (*Myotis thysanodes*)

Status

Status Designation: Federal, candidate (C2) species (USFWS); State of Idaho, protected nongame species of special concern.

The fringed myotis occurs with limited distribution in the Forest Service Northern Region. It is found from north-central Idaho and southwestern Montana southward and appears to be near the northern distributional limits of its range. Fringed myotis was netted during a bat survey at Moose Creek Ranger Station in August 1998. The species is commonly found in Hell's Canyon but not found often in other parts of central Idaho.

Ecology

Fringed myotis is found in desert, grassland, and woodland habitats, primarily at middle elevations of about 3,900 to 7,050 feet. It is known to be active from April through September. Fringed myotis roosts in caves, mines, rock crevices, buildings, and other protected sites. In a study in Arizona, Morrell et al. (1994) recorded this species using roost sites in snags. Eighty percent of the snags used were ponderosa pine, and 66 percent of all snags used had loose bark and some intact branches. Chung-MacCoubrey (1996) found maternity roosts of this species in large, hard ponderosa pine snags and live ponderosa with long, vertical cracks or loose bark.

In Montana, Butts (1993a and 1993b) recorded fringed myotis in riparian areas within mature Douglas-fir forest, and ponderosa pine-juniper woodland between about 5,250 and 8,200 feet in elevation. Fringed myotis often forages close to vegetative canopy. Insectivorous, they commonly prey on beetles and moths.

In Idaho, fringed myotis is found with many other species, including long-eared myotis, long-legged myotis, and California myotis. Fringed myotis is known to roost communally, but never closer than 9.8 feet to other bat species. Ecology of this species, particularly winter ecology, is largely unknown.

Departures from Historic Conditions and Current Threats

Historic and present population status of fringed myotis in unknown. Fringed myotis is easily disturbed by human presence. Disturbance by humans would be primarily associated with buildings occupied by people at administrative sites or at private residences within the subbasins where bats are usually unwelcome visitors. Habitat related risks may be associated with loss of snag roost site production in the subbasins due to fire suppression and timber harvest.

NEOTROPICAL MIGRANT LANDBIRDS

Status and Ecology

Neotropical migrant landbirds are birds that migrate to the tropics to winter and return to North America to breed. Of the 241 bird species that breed in Idaho, 119 are neotropical migrants.

Seventy-eight percent of the neotropical migrants are *obligate* migrants meaning that nearly all members of the species migrate to the tropics. The other 42 species are *facultative* migrants, or species in which only some individuals migrate long distances. Most of Idaho's neotropical migrants, particularly the obligates, are passerines, also known as perching or songbirds. This group includes flycatchers, thrushes, and warblers. Most of the neotropical migrant raptors are facultative migrants with individuals commonly seen by Idaho birders in winter.

Most neotropical migrants can be found throughout Idaho. Relatively more species can be found in riparian habitat and forested habitat than in others. Shrubland habitats are also important. Wetlands and agricultural areas contain relatively fewer species. More species nest in tree canopies but ground and shrub nesting locations are also important. Most Idaho migrants feed on insects.

In a landbird survey conducted in 1995 and 1996, more than 45 migrant bird species were recorded in the lower Selway subbasin on Forest Service land. Two of these species, Townsend's warbler and Fox sparrow, are relatively uncommon in Idaho. As a result, no population trend data is available. Townsend's warbler is dependent on continuous forested habitat and the Fox sparrow inhabits riparian woodlands. Both rely on primarily unroaded and undisturbed habitats. The survey documented many occurrences of Townsend's warbler in Meadow Creek and O'Hara and Goddard ERUs. Significant occurrences were also found in the Lower Selway Canyon ERU. Several occurrences of Fox sparrow were also recorded in the Meadow Creek ERU. Fox sparrow has also been observed, although rarely, in the Upper Selway Canyon ERU (Wright, 1988-1995). Vaux's swift, also uncommon in Idaho, has been more commonly observed in the Upper Selway Canyon ERU in expected habitat (Wright, 1988-1995).

Departures from Historic Conditions and Current Threats

Breeding bird surveys conducted in Idaho from 1980 through 1989 and analyzed by USFWS found trends showing 7 species in significant decline. All 7 species are known to occur in the assessment area and include house wren, loggerhead shrike, rufous-sided towhee, Brewer's sparrow, vesper sparrow, white-crowned sparrow, and dark-eyed junco. The house wren and towhee declines appear to be localized and not regional. Both these species frequently nest in riparian habitats.

Most of the analysis area is designated wilderness or roadless and provides optimal habitat for many migrant landbirds, although some potential threats may be important. Factors associated with potential loss of breeding habitat in the analysis area include weed invasions, fire suppression, and habitat conversion and fragmentation. Weed invasions and fire suppression have the most influence in xeric habitats in the analysis area, although reduction in shrub habitat in mesic environments is also an important impact. Conversion and fragmentation of habitats is primarily associated with timber harvest and agriculture practices in the lower subbasins.